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The Role of Emotion Regulation and Social Problem Solving Skills in the
Relationship Between Childhood Maltreatment and Post Traumatic Stress
Symptoms in an Adult Male Forensic Mental Health Population



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Doctorate in Clinical Psychology

The University of Edinburgh

May 2015

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Abstract

Objective: Posttraumatic Stress Disorder (PTSD) is highly prevalent in clinical and forensic mental health populations. Understanding the link between childhood maltreatment and the underlying mechanisms that can increase the vulnerability to developing and maintaining PTSD is imperative in clinical conceptualisations and intervention targets. A significant proportion of research is conducted with non mental health populations and there is a paucity of research with forensic populations. The first objective was to review the literature, in clinically related and forensic samples, investigating the association of emotion regulation with childhood maltreatment and Posttraumatic Stress (PTS) symptoms/PTSD. Emotion dysregulation and social problem solving deficits are commonly reported in the forensic population and have been associated with a number of psychopathologies. The empirical study examined the role of emotion regulation and social problem solving skills in the relationship between childhood maltreatment and adulthood trauma symptomatology in a male forensic population.

Method: A systematic search of literature investigating the role of emotion regulation in relation to childhood maltreatment and/or PTS symptoms/PTSD was conducted using electronic databases; Medline, PsycINFO, Cinahl, Behavioural and Sciences Collection, EMBASE and PILOTS. Studies that met predetermined inclusion criteria were systematically reviewed. The empirical study employed a cross sectional design to examine the role of emotion regulation and social problem skills in the relationship between childhood maltreatment and adulthood trauma symptomatology. Fifty two male forensic mental health patients completed four self-report questionnaires;

Childhood Trauma Questionnaire, Difficulties in Emotion Regulation Scale, Social Problem Solving Inventory-Revised: Short Form and the Post Traumatic Stress Disorder Checklist – Civilian Version.

Results: The systematic review indicated strong evidence to suggest links between childhood maltreatment and emotion dysregulation, and emotion dysregulation and PTS symptoms/PTSD within clinically related and forensic samples. Preliminary evidence suggests a mediating role of emotion regulation in the relationship between childhood maltreatment and PTSD. The empirical study found that overall childhood maltreatment, childhood emotional abuse, sexual abuse and emotional neglect were associated with greater emotion dysregulation. Childhood sexual abuse, emotional neglect and physical neglect were associated with poorer social problem solving skills. With the exception of childhood physical abuse, all forms of childhood maltreatment, emotion dysregulation and poor social problem solving were correlated with greater trauma symptomatology. Mediation analysis indicated that both emotion dysregulation and poor social problem solving mediated the relationship between childhood emotional neglect and PTS symptoms in adulthood.

Conclusions: The systematic review identified that further research is required within clinical populations to better understand the underlying causal pathways between childhood maltreatment and the development and maintenance of PTS symptoms/PTSD. The empirical study gives further insight into the forensic psychopathology and highlights the relevance of emotion regulation and social problem solving in the treatment of PTS symptoms.

Chapter 1: Systematic Review

1.1 Title Page

Childhood Maltreatment, Emotion Regulation and Posttraumatic Stress Symptoms: A Systematic Review

(Written in accordance with the author submission guidelines for Acta Psychiatrica Scandinavica, see Appendix 1)

Short title for running head:

Childhood Maltreatment, Emotion Regulation and Posttraumatic Stress Symptoms

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1.2 Abstract ¹

Objective: To examine the association of emotion regulation with childhood maltreatment and/or Posttraumatic Stress (PTS) symptoms/Posttraumatic Stress Disorder (PTSD).

Method: A systematic search of peer reviewed journal articles from 1980 to January 2015 was conducted using electronic databases; Medline, PsycINFO, Cinahl, Behavioural and Sciences Collection, EMBASE and PILOTS. Studies included investigated the association of emotion regulation with childhood maltreatment and/or PTS symptoms/PTSD.

Results: Thirteen studies were qualitatively analysed. Childhood maltreatment is associated with emotion dysregulation, although evidence is mixed regarding what type/s of maltreatment is/are associated with emotion dysregulation. Emotion dysregulation is greater in samples with PTSD than those without PTSD. Emotion dysregulation is consistently associated with PTS symptoms/PTSD and predicts PTSD status. Preliminary evidence suggests a mediating role of emotion dysregulation between childhood maltreatment and PTSD.

Conclusions: There is strong evidence to suggest links between childhood maltreatment and emotion dysregulation, and emotion dysregulation and PTS symptoms/PTSD within clinically related and forensic samples. There is a lack of evidence to examine the mediating role of emotion regulation. Further research is required within clinical and forensic populations to better understand the underlying

¹ Note that the headings for the systematic review and empirical study have been numbered for the purpose of the thesis continuity and numbering would not be included for journal article submission.

causal pathways between childhood maltreatment and the development and maintenance of PTS symptoms/PTSD.

Key words: emotion; child maltreatment; posttraumatic; review

Summations:

- Individuals who have experienced childhood maltreatment are more likely to have difficulties with emotion regulation.
- Individuals who have difficulties with emotion regulation are more vulnerable to developing and maintaining PTS symptoms/PTSD.
- The associations imply emotion regulation is an important target for therapeutic intervention.

Considerations:

- More research exploring the mediating role of emotion regulation in the relationship between childhood maltreatment and PTS symptoms/PTSD in clinical and forensic populations is needed.
- No studies were available from the UK.
- The review is based on studies using cross sectional and case control designs. Review of literature including other study designs, such as experimental and longitudinal designs, is warranted.

1.3 Introduction

Approximately 1 in 5 children suffer from severe maltreatment (1). It has been well documented that childhood maltreatment can have a detrimental impact on a child, affecting multiple systems relating to psychological and neurobiological development. Maltreated children have an increased risk of developing difficulties such as, regulating affect, forming secure attachments with caregivers, developing peer relationships and displaying more antisocial behaviours (2). Maladaptive psychological and neurobiological development can also lead maltreated children to suffer from long term negative sequelae, such as increased risk of substance misuse, suicidal behaviour (3) and increased vulnerability to developing psychological disorders, including Depression, Anxiety and Posttraumatic Stress Disorder (PTSD) (2, 4).

Evidence indicates longitudinal links between childhood maltreatment and increased risk of developing PTSD (2, 5, 6). PTSD is characterised by symptoms of intrusions, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity in response to direct or indirect exposure to traumatic events (7). It is estimated that approximately 25 - 30% of individuals who have experienced a traumatic event may develop PTSD (8), with adult lifetime prevalence of PTSD estimated to be no more than 7 - 8% (9, 10). These figures likely underestimate distress experienced, as they do not capture the large proportion of individuals who do not meet the full criteria for PTSD, but experience Posttraumatic Stress (PTS) symptoms (10). Although there is a high prevalence of PTSD in people who have experienced childhood maltreatment, a significant proportion of individuals do not go on to develop PTSD or PTS symptoms (8).

A number of variables have been examined to understand the fundamental pathways whereby early maltreatment increases the risk of developing and maintaining PTSD. One variable that has received interest is emotion regulation. Emotion regulation is a multifaceted construct, serving a pertinent function in early development and allowing children to learn to function adaptively in emotionally challenging situations. Developmental theorists argue that intrinsic factors, such as the child's temperament and biological variables, as well as extrinsic factors, such as stressful life experiences and problematic attachment with caregivers in early childhood, can significantly disrupt the development of emotion regulation (11). For example, maltreatment in an invalidating, abusive or neglectful environment has been shown to affect a child's implicit and explicit learning of adaptive coping with aversive emotions. Attempts to manage high levels of negative affect as a consequence of maltreatment, such as using avoidance, can contribute to greater emotion dysregulation.

Maladaptive coping is central in the conceptualisation of PTSD in cognitive (12) and metacognitive (13) models. Dysfunctional emotion regulation strategies, such as suppression of emotions, avoidant coping and rumination do not allow successful processing of the trauma. Ehlers and Clark (12) propose maladaptive coping can interfere with extinction learning and fear habituation that is required to disconfirm beliefs related to the negative appraisal of the trauma, thus in the longer term contributes to the development and maintenance PTSD. A key component of treatment therefore includes changing coping strategies to allow the processing and reappraisal of trauma stimuli (12).

Studies offer strong evidence for the association between childhood maltreatment and a number of developmental consequences, of which emotion

dysregulation is a dominant feature (14). A recent meta-analysis (15) of the association between emotion regulation strategies and PTS symptoms concluded that general emotion dysregulation and maladaptive emotion regulation strategies (e.g. rumination, thought suppression and experiential avoidance) were more strongly related to PTS symptoms than adaptive emotion regulation strategies. The associations were not moderated by trauma type or sample, signifying emotion regulation is a critical construct in those suffering from PTS symptoms (15). Studies also support the mediating role of emotion regulation (16); that individuals with a history of childhood trauma experience greater emotion regulation difficulties in comparison to those who have not experienced a history of abuse. With emotion regulation difficulties being associated with increased PTS symptoms and PTSD.

Despite the convincing evidence base, a large proportion of these studies rely on community and non mental health clinical populations. There are also numerous emotion regulation measures that fail to consistently assess the complexity of emotion regulation constructs. The use of such populations and measure variance limits the generalisability of findings in which emotion regulation is implicated in the relationship between childhood maltreatment and PTS symptoms/PTSD. Given the evidence across an array of populations, it is hypothesised that childhood maltreatment will be associated with poorer emotion regulation and emotion dysregulation will be associated with greater PTS symptoms/PTSD in forensic and clinically related populations.

Aims of the Study

To systematically appraise the literature that assess emotion regulation and the association with childhood maltreatment and/or Posttraumatic Stress

symptoms/Posttraumatic Stress Disorder. The aim is to address the generalisability of findings and better understand the link between childhood maltreatment, emotion regulation and Posttraumatic Stress symptoms/Posttraumatic Stress Disorder in clinically related and forensic groups.

1.4 Material and Methods

1.4.1 Study Selection Criteria

Table 1 outlines the inclusion exclusion criteria for the literature search. Only adult clinical mental health, forensic and substance misuse populations were considered for this review to increase the representativeness and external validity of the findings for clinically related samples. Student, community, military and eating disorder populations, and populations following war, natural disasters and medical procedures were excluded, as they are conceivably different to the included populations. The review aimed to increase the generalisability of finding across related clinical and forensic populations.

Published research primarily investigates either the relationship between emotion regulation and childhood maltreatment or emotion regulation and trauma symptomatology. There is a paucity of literature investigating the mediating role of emotion regulation in the relationship between childhood maltreatment and adulthood trauma symptomatology. Therefore, studies that provided data on at least one relationship between emotion regulation and either childhood maltreatment or adulthood trauma symptomatology, irrespective of whether these variables were central to the main aim of the study, were included, as well as studies investigating the

relationship between all three variables. The review focused on literature that assessed the strength and nature of the relationship between variables. Treatment studies were not included.

Emotion regulation is a multifaceted concept (17). In order to eliminate the variability in methodology of studies investigating single components of emotion regulation (for example, studies which only measure emotion awareness or emotional expression), only studies that included a multidimensional measure of overall emotion regulation capacity were accepted as having assessed for emotion regulation. Studies that used a multidimensional emotion regulation measure, but only analysed a single construct were excluded. Only studies published from 1980 onwards were included due to there being limited research on emotion regulation and a lack of multidimensional and reliable emotion regulation measures prior to this date.

Childhood maltreatment encompasses all forms of physical and emotional ill-treatment; emotional, physical and sexual abuse and emotional and physical neglect, which occurred within the first 18 years of an individual's life (18). Samples that included one or more types of childhood maltreatment, irrespective of severity or frequency were included in the review.

Studies were accepted as having investigated adulthood trauma symptomatology if it was assessed using a valid and reliable measure of trauma symptoms or Posttraumatic Stress Disorder. Measures were deemed as valid and reliable as indicated in reviewed literature (17, 19-20).

Table 1. Study Selection Criteria for Literature Search

Domain	Inclusion Criteria	Exclusion Criteria
<i>Study population</i>	Clinical samples seeking treatment or receiving treatment within Mental Health Services, substance misuse (seeking or receiving treatment) and forensic populations in Mental Health Services or prison. Adults, over 18 years of age.	Samples measuring trauma symptoms in military populations, following war, natural disasters, medical procedures and eating disorders.
<i>Time period</i>	Published between 1980 and January 2015.	
<i>Publication criteria</i>	Published articles written in English language. Articles in peer reviewed journals.	
<i>Study design</i>	Quantitative design.	
	Cohort, case control and case series.	Treatment studies.
	Investigating emotion regulation in the relationship between childhood maltreatment and trauma symptomatology OR Investigating a relationship between emotion regulation and either childhood maltreatment or trauma symptomatology.	Emotion regulation was not included within the investigated relationship.
<i>Outcome measures</i>	Studies had to use a valid and reliable measure relevant to each variable of interest of the review aims.	
	A measure of overall emotion regulation was accepted as having assessed for emotion regulation.	Measures assessing only a single component of emotion regulation (e.g. emotional awareness).
<i>Analysis</i>	Analysis conducted conveyed a statistical measure of the relationship between variables of interest.	

1.4.2 Literature Search Strategy

On the 8th January 2015, EMBASE, PILOTS and, using EBSCO host, Medline, PsycINFO, Cinahl and Psychology and Behavioural Sciences Collection were searched. On databases whereby limitations could be set, the following singular or multiple limits were applied; English language, adulthood (18 years of age and above), peer reviewed journal article and published in 1980 onwards. Childhood maltreatment search terms included: ("child\$ abuse" OR "child\$ sexual abuse" OR "child\$ physical abuse" OR "child\$ emotional abuse" OR "child\$ emotional neglect" OR "childhood maltreatment" OR "child\$ trauma"). Emotion regulation search terms were: ("emotion\$ regulation" OR "emotion\$ dysregulation" OR "affect regulation\$") and adulthood trauma symptomatology terms were: ("PTSD" OR "trauma symptom\$" OR "post traumatic\$"). Three combinations of the search terms were conducted to independently search for literature relating to childhood maltreatment and emotion regulation, emotion regulation and adulthood trauma symptomatology, and thirdly for literature investigating childhood maltreatment, emotion regulation and adulthood trauma symptomatology.

A total of 693 articles were yielded from the six databases. Following de-duplication (n = 302), a further 350 articles were removed after screening the title and abstract. The remaining 41 articles were read for suitability using the inclusion criteria and their reference lists were searched for further relevant studies. Twenty nine of these articles failed to meet the inclusion criteria and were removed. Two articles were sourced from searching reference lists, resulting in 14 identified studies for review. One duplicate publication (21) (i.e. the same sample was used in an earlier study) was excluded to minimise the risk of overestimating findings. This yielded 13 studies for qualitative analysis. The literature review process is illustrated in Fig. 1.

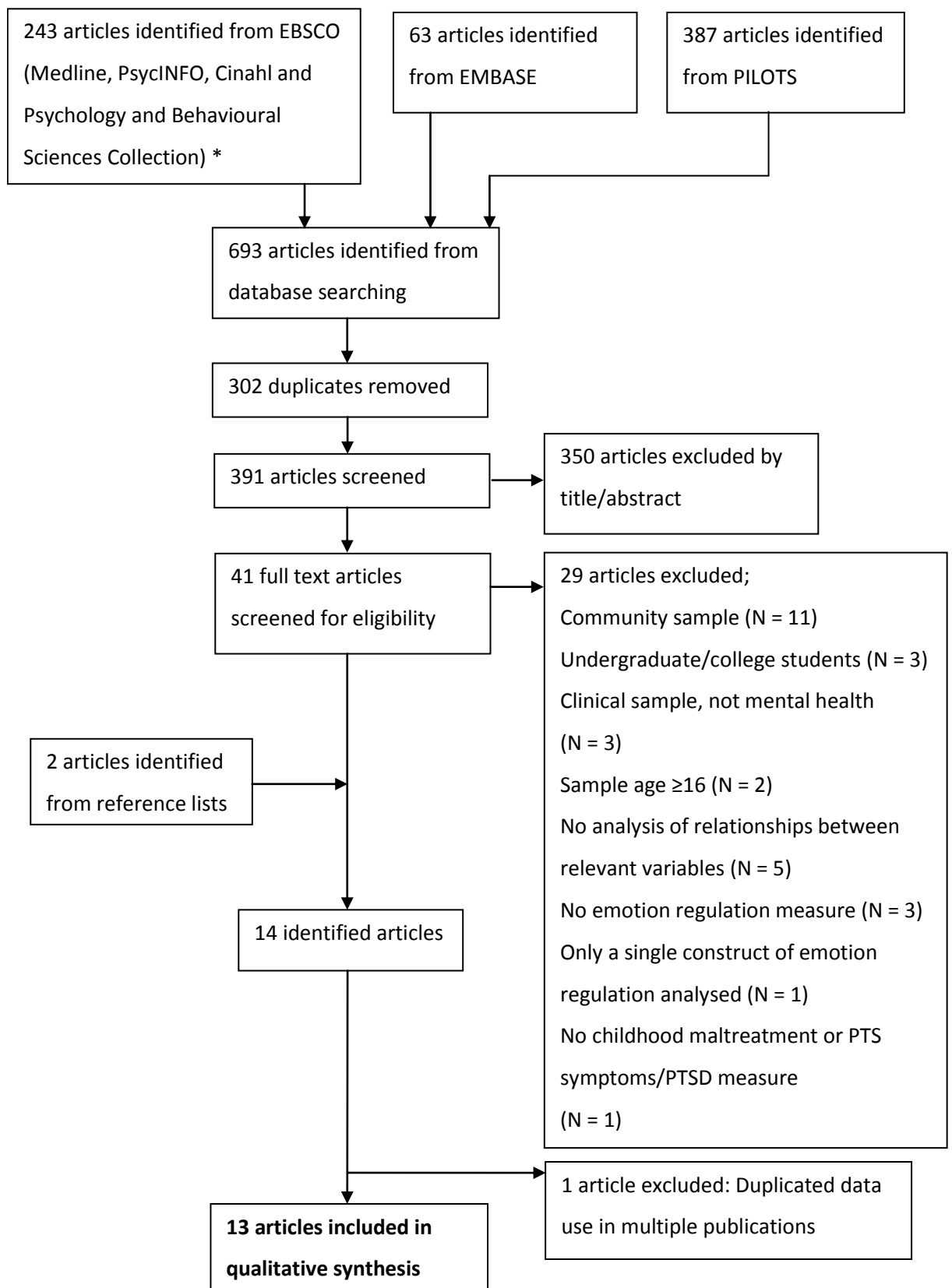


Fig.1. Literature search flowchart

* Duplicates simultaneously removed between EBSCO databases when searched.

1.4.3 Assessment of Quality of Included Studies

The Centre for Research and Dissemination (22) indicate the most appropriate tool for assessing the methodological quality of studies is determined by the nature of the systematic review and recommend principles on which to base quality assessments. Quality assessments have been developed by the Scottish Intercollegiate Guidelines Network (SIGN) for cohort studies (23) and the National Institute for Health and Clinical Excellence (NICE) provide guidelines for appraisal of studies reporting correlations and associations (24). Neither of these individually fulfilled a suitable checklist to assess the quality of studies for this review, thus relevant criterion were amalgamated to identify nine quality criteria.

The quality of studies were assessed on the basis of the following criteria: sample (sampling strategy and representatives of target population, number of people approached and attrition rates), reporting of validity and reliability of outcome measures, analysis (handling of missing data, sample size for sufficient power and conducted analysis, appropriateness of analyses and precision of associations), internal validity/management of confounding variables and external validity. The quality criteria were rated in accordance with SIGN guidance on a scale of: 0 (*not addressed, not reported and not applicable*), 1 (*poorly addressed*), 2 (*adequately addressed*) and 3 (*well covered*). Appendix 2 details the rating descriptions per quality criteria.

To ensure reliability and reduce potential bias, quality assessment was completed by two reviewers; the primary author and KP or EW. Overall there was a high degree of agreeability ($\kappa = .81$, $p < 0.001$, 95% CI: .73 - .89). Discrepancies between scores amounted to one point of a difference and were discussed to reach a mutually agreed rating.

1.4.4 Data Synthesis

A number of the identified studies had a wider focus than the aims of this review. Only relevant findings pertinent to the review of emotion regulation and childhood maltreatment or PTS symptoms/PTSD, as well as those involving all three variables, are discussed. A meta-analysis was not conducted due the heterogeneity of outcomes and analyses that were conducted to meet the wider aims of the included studies, which were not specific to the review. Effect sizes and strength of associations between the review variables have been reported or calculated if the paper provided sufficient information. Quality assessment and data extraction was based solely on the published article.

1.5 Results

1.5.1 Characteristics of the Included Studies

The characteristics and key findings of the 13 identified studies (25-37) are summarised in Table 2. For clarity, the studies have been sub-divided in to three categories based on the investigated relationships relevant to the review; those that investigated the relationship between two variables; childhood maltreatment and emotion regulation (25-30), and emotion regulation and adulthood trauma symptomatology (31-35), and studies which investigated the association between the three variables: childhood maltreatment, emotion regulation and adulthood trauma symptomatology (36-37).

All included studies employed a cross-sectional design, three of which also included control comparison groups (27, 29, 35). Of the 13 identified studies, 10 were conducted in the United States of America (25, 28, 30-37), 1 in Korea (26), 1 in the

Netherlands (29) and 1 in Germany (27). The sample size in the studies ranged from 58 to 582 (mean = 220). Six studies utilised a substance misuse population (25, 28, 33-35, 37), five utilised clinical mental health patients; four included outpatients (26-27, 31-32), one included inpatients (29), and two studies comprised a prison population (30, 36). Nine studies used a mixed gender sample (25-29, 33-35, 37), and four used a female sample (30-32, 36).

Childhood maltreatment and emotion regulation was assessed using self-report measures in all studies. The Childhood Trauma Questionnaire (CTQ) was the most commonly used measure of childhood maltreatment, which assesses childhood sexual, physical and emotional abuse, and physical and emotional neglect. The Difficulties in Emotion Regulation Scale (DERS) was used most frequently to assess emotion regulation capacity. The DERS assesses six emotion regulation constructs: acceptance of emotional responses, goal directed behaviour when upset, impulse control, emotional awareness, access to emotion regulation strategies and emotional clarity. Adulthood trauma symptomatology was assessed using self-report measures in five studies (32-34, 36-37) and clinician administered assessments in two studies (31, 35).

Table 2. Methodological Characteristics and Outcomes of Included Studies

Childhood Trauma and/or Maltreatment (CT/M) and Emotion Regulation (ER)						
Study	Primary Aim	Sample and Mean Age (SD)	Study Design	Study Measures	Analysis of Association	Main Findings
Banducci et al. (25) USA	Examine the relationship between types of childhood abuse and maladaptive behavioural and emotional outcomes.	280 substance users (84 female, 196 male). Mean age = 43.3 (9.79).	CS	CT/M: CTQ (only abuse scales used) ER: DERS	Multiple regression	CEA was associated with scores indicating greater ER difficulties ($p < .01$). CEA uniquely predicted ER difficulties over and above CSA and CPA ($B = -.614$, $p < .001$). CSA and CPA were not significant in the final model.
Choi et al. (26) Korea	Examine whether childhood abuse predicts symptom complexity and whether emotion regulation difficulties mediate the relationship.	162 outpatients seeking treatment with a diverse range of psychiatric diagnoses (90 female, 71 male)*. Mean age = 40.2 (15.44).	CS	CT/M: CTQ - Korean (only abuse scales used) ER: DERS (Translated)	Partial correlations Structural equation modelling	CPA ($r = .43$) and CEA ($r = .41$) were strongly associated with ER difficulties ($p < .001$). CSA was not significantly associated with ER. Overall childhood abuse was significantly associated with emotion regulation difficulties ($\beta = .53$, $p < .001$).

Table 2. *Continued*

Carvalho Fernando et al. (27)	Examine the quality and severity of self reported childhood trauma on emotion regulation difficulties and their associations in Borderline Personality Disorder (BPD), Major Depressive Disorder (MDD) and healthy controls.	49 patients with Borderline Personality Disorder (44 female, 5 male). Mean age = 28.63 (8.99). 48 patients with major depressive disorder (26 female, 22 male). Mean age = 33.15 (8.89). 63 healthy controls from the community (41 female, 22 male). Mean age = 31.44 (9.98).	CS Case control	CT/M: CTQ - German ER: DERS ERQ (Translated)	ANOVA	Significantly greater levels of ER difficulties in BPD sample ($p < .01$, cohen's $d = 3.314$, CI: .014 - 6.614) and MDD sample ($p < .01$, cohen's $d = 3.003$, CI: -.045 - 6.051) compared to controls. Significantly greater levels of childhood maltreatment in BPD sample (CEA: cohen's $d = 1.78$, CI: 0.96 - 2.59; CPA: cohen's $d = .75$, CI: .12 - 1.39; CSA: cohen's $d = .60$, CI: -.28 - 1.48; CEN: cohen's $d = 1.33$, CI: .40 - 2.27; CPN: cohen's $d = .78$, CI: .17-1.39) compared to healthy controls (all $ps < .01$). Significantly greater levels of CEA ($p < .01$, cohen's $d = .82$, CI: -.03 - 1.67) and CEN ($p < .01$, cohen's $d = .85$, CI: -.18 - 1.88) in MDD sample compared to controls.
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Table 2. *Continued*

Carvalho					Multiple regression	CEA and CEN significantly predicted ER difficulties ($\beta = .33$ and $.45$, $p < .01$).
Fernando et al. (27) <i>Cont.</i>						CPA, CSA and CPN did not significantly predict ER difficulties.
Germany						
Gratz et al. (28)	Examine the role of childhood maltreatment, negative affect intensity	76 residents in a substance and alcohol treatment centre (25 female, 51 male).	CS	CT/M: CTQ	Correlations	Emotion dysregulation was significantly associated with childhood maltreatment ($r = .5$, $p < .01$).
USA	/ reactivity, and emotion dysregulation in Borderline Personality diagnosis (BPD) and symptom count.	Mean age = 42.21 (8.16).		ER: DERS	Hierarchical regression	Childhood maltreatment significantly predicted emotion dysregulation ($\beta = .33$, $sr^2 = .08$).
Van Dijke et al. (29)	Examine the relationship between childhood traumatization by primary caregiver and affect regulation.	472 psychiatric inpatients (327 female, 145 male). Mean age = 34.7 (10.1).	CS Case Control	CT/M: TEC- Dutch (divided: 0-6, 7-12 and 13-18 years).	Correlations	Childhood maltreatment between 0-6 years positively correlated with emotion dysregulation ($r = .11$, $p \leq .05$). No significant associations with other developmental epochs.
Netherlands						

Table 2. Continued

Van Dijke et al. (29) Cont.				ER: SIDES-Revised (self report: Dutch)		Childhood emotional traumatisa-tion by primary caregiver significantly associated with emotion dysregulation ($r = .14$, $p \leq .01$). Childhood sexual and physical traumatisa-tion by primary caregiver was not significantly associated with emotion dysregulation.
Walsh et al. (30)	Examine associations between childhood maltreatment and inmate perpetrated prison sexual victimisation and whether this is linked by emotion dysregulation.	168 female prisoners (9.3). Mean age = 35.4	CS	CT/M: CTQ	Bivariate correlations	All subscales of CTQ were significantly correlated with emotion dysregulation (CSA: $r = .33$, CPA: $r = .33$, CEA: $r = .41$, CPN: $r = .26$, CEN: $r = .28$, all $ps < .01$). Cumulative childhood maltreatment was significantly associated with emotion dysregulation ($r = .29$, $p < .01$).
USA				ER: DERS		

Table 2. *Continued*

Posttraumatic Stress Disorder (PTSD) or Symptoms and Emotion Regulation (ER)						
Study	Primary Aim	Sample and Mean Age (SD)	Study Design	Outcome Measures	Analysis of Association	Main Findings
Cloitre et al. (31) USA	Examine the relationship between childhood cumulative trauma and symptom complexity.	582 females seeking treatment resulting from childhood abuse. Mean age = 36.1 (10.6).	CS	ER: NMR PTSD: CAPS	Correlations	Moderate negative correlation between negative mood regulation and PTSD ($r = -.34$, $p < .05$), indicating as PTSD symptoms increase, emotion regulation ability decreases.
Cloitre et al. (32) USA	Examine the contribution of emotion regulation difficulties and interpersonal functioning, compared to PTSD symptoms in predicting functional impairment.	164 females with a history of CSA and / or CPA seeking treatment. Mean age = 34.1 (9.4).	CS	ER: NMR PTSD: MPSS	Zero-order correlations	No significant correlation between emotion regulation and PTSD symptoms.

Table 2. *Continued*

Fairholme et al. (33)	Examine the predictive power of emotion dysregulation and insomnia on symptom severity across four psychopathologies: anxiety, depression, PTSD and alcohol dependence.	220 residents at a substance use treatment centre (108 female, 112 male). Mean age = 33.7 (10.2).	CS	ER: DERS PTSD: IES-R	Correlations Multiple regressions	Emotion dysregulation was positively associated with scores indicating greater posttraumatic stress symptoms ($r = .45$, $p < .001$). Emotion dysregulation was uniquely predictive of PTSD ($\beta = .38$, $p < .001$). Specific domains of ER; GOALS and IMPULSE were significant predictors of PTSD ($\beta = .23$ and $\beta = .17$, both $ps < .05$). No other domains of ER were significant.
McDermott et al. (34)	Examine relationships between anxiety sensitivity, difficulties with emotion regulation and probable PTSD.	58 crack/cocaine dependent patients (17 female, 41 male) in residential substance misuse treatment.	CS	ER: DERS PTSD: PCL	ANCOVA	Participants with probable PTSD had significantly greater emotion regulation difficulties (partial $\eta^2 = .36$, $p < .001$).

Table 2. *Continued*

McDermott et al. (34) <i>Cont</i> USA	Mean age = 45.43 (7.04).				Logistic regression	ER domains: NON-ACCEPT (partial $\eta^2 = .19$, $p < .01$), GOALS (partial $\eta^2 = .13$, $p < .05$), IMPULSE (partial $\eta^2 = .13$, $p < .05$), STRATEGIES (partial $\eta^2 = .29$, $p < .001$) and CLARITY (partial $\eta^2 = .17$, $p < .01$) were significantly higher in probable PTSD sample compared to the non-PTSD sample. Lack of emotional awareness was not significantly different between groups.
						Emotion dysregulation significantly predicted probable PTSD when controlling for anxiety symptom severity ($\beta = .10$, OR = 1.11, $p < .01$) and when controlling for anxiety sensitivity ($\beta = .12$, OR = 1.13, $p < .01$).
Weiss et al. (35) USA	Examine associations between PTSD, emotion dysregulation constructs and impulsivity in a	205 substance use disorder in a residential treatment facility.	CS Case control	ER: DERS	MANCOVA	Patients with PSTD had significantly greater emotion dysregulation compared to those without PTSD (Cohen's $d = .87$, CI: -2.45 - 4.18, $p < .001$).

Table 2. Continued

Weiss et al. (35) <i>Cont.</i>	sample of trauma exposed substance misuse disorder inpatients.	58 with PTSD (17 female, 41 male). Mean age = 35.72 (10.66). 147 non-PTSD (87 female, 60 male). Mean age = 35.41 (10.27).	PTSD: CAPS	PTSD sample had significantly greater difficulties on specific domains of ER; NON- ACCEPT (cohen's $d = .81$, CI: $-.01 - 1.62$, $p < .001$), GOALS (cohen's $d = .64$, CI: $-.03 - 1.30$, $p < .001$), IMPULSE (cohen's $d = .64$, CI: $-.19 - 1.47$, $p < .001$), STRATEGIES (cohen's $d = 1.01$, CI: $.07 - 1.95$, $p < .001$) and CLARITY (cohen's $d = .42$, CI: $-.17 - 1.01$, $p < .01$). There were no significant differences between PTSD and non-PTSD groups regarding lack of emotional awareness.
			Logistic regression	Emotion dysregulation was a significant predictor of PTSD status ($\beta = .03$, OR = 1.03, CI: 1.02 - 1.05, $p < .001$).

Table 2. *Continued*

Childhood Trauma and/or Maltreatment (CT/M), Posttraumatic Stress Disorder (PTSD) or Symptoms and Emotion Regulation (ER)						
Study	Primary Aim	Sample and Mean Age (SD)	Study Design	Outcome Measures	Analysis of Association	Main Findings
Johnson & Lynch. (36) USA	Examine the associations between CSA, emotion regulation, posttraumatic stress and coping.	224 incarcerated women. Mean age = 34.96 (9.85)	CS	CT/M: THQ ER: DERS PTSD: PCL-C	Structural Equation Modelling	Self blame mediated the relationship between CSA and emotion dysregulation (indirect effect = .509, $p = .02$), and between CSA and posttraumatic stress (indirect effect = 2.178, $p = .02$). Significant positive association between PTSD and ER difficulties ($r = .48$, $p < .001$).
Weiss et al. (37) USA	To examine associations among childhood abuse, emotion dysregulation, and probable PTSD	93 substance use disorder (SUD) patients (71 male, 22 female) in residential treatment. Mean age = 40.62 (9.68).	CS	CT/M: CTQ (only abuse scales used) ER: DERS	Correlations	CEA positively associated with emotion dysregulation ($r = .30$, $p \leq .001$). No significant correlations between CSA and CPA and ER. ER subscales; GOALS and IMPULSE were positively associated with CPA ($r = .29$ and $r = .28$, all $ps \leq .01$) and CEA ($r = .28$ and $r = .34$, all $ps \leq .01$). CLARITY and

Table 2. Continued

Weiss et al. (37) <i>Cont.</i> USA	PTSD: PCL- C	STRATEGIES were positively associated with CEA ($r = .27, p \leq .01$ and $r = .33, p \leq .001$). CSA was not significantly correlated with domains of ER. ER scores were positively correlated with PTS ($r = .36, p \leq .001$). MANCOVA PTSD sample had significantly greater emotion dysregulation compared to the non PTSD sample (cohen's $d = 0.9$, CI: -3.26 - 5.19, $p = .02$). ER domains: GOALS (cohen's $d = 0.9$: CI: .03 -1.75, $p = .03$), IMPULSE (cohen's $d = 1.14$, CI: .18 - 2.09, $p = .001$) and STRATEGIES (cohen's $d = 1.13$ CI: -0.01 - 2.28, $p = .002$) significantly greater in the PTSD group. There were no between group differences for Non-ACCEPT, AWARE or CLARITY.
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Table 2. Continued

Weiss et al.		ER domain: only IMPULSE uniquely
(37) <i>Cont.</i>		associated with PTSD status ($\beta = .18$, $p < .01$).
USA		
	Mediation modelling	ER domain: only IMPULSE fully mediated the relationship between childhood emotional abuse ($\beta = .06$, CI: .01-.14, $p \leq .05$) or physical abuse ($\beta = .05$, CI: .004 - .12, $p \leq .05$) and probable PTSD status.

Note. CAPS: Clinician Administered PTSD Scale, CS: cross sectional, CEA: childhood emotional abuse, CEN: childhood emotional neglect, CPA: childhood physical abuse, CPN: childhood physical neglect, CSA: childhood sexual abuse, CTQ: Childhood Trauma Questionnaire, DERS: Difficulties in Emotion Regulation Scale, AWARE: lack of emotional awareness, CLARITY: lack of emotional clarity, GOALS: difficulties engaging in goal directed behaviour when upset, IMPULSE: difficulties controlling impulse behaviours, NON-ACCEPT: non-acceptance of emotional responses, STRATEGIES: lack of effective emotion regulation strategies, ERQ: Emotion Regulation Questionnaire, IES-R: Impact of Events Scale - Revised, MPSS: Modified PTSD Scale, NMR: The General Expectancy for Negative Mood Regulation Scale, PCL-C: Post-Traumatic Stress Disorder Checklist-Civilian Version, SIDES: Structured Interview for Disorders of Extreme Stress, sr^2 : squared semi-partial correlation, TEC: Traumatic Experiences Checklist, THQ: Trauma History Questionnaire.

* Inconsistency in reported data in paper. Sample size per gender independently calculated from paper percentages.
Cohen's d (M1 - M2/pooled SD).

1.5.2 Appraisal of Study Quality

The methodological quality for each of the 13 included studies is reported in Table 3. The ratings provide only a relative measure of methodological strengths and limitations of each quality criteria and do not provide a standardised total summary.

The majority of studies were of moderate to high quality, but a number of limitations were highlighted. There was variation in study quality of defining the sampling strategy and providing explicit inclusion/exclusion criteria. Five of the 13 included studies (25, 29-32) had an inadequate description of the sampling methodology to assess the representativeness of the target population. The majority of studies failed to report the number of people approached and attrition rates, with only three studies addressing this issue (25, 30, 36). It was deemed 'not applicable' to rate nine of the studies (26-29, 31-32, 34-35, 37) on the handling of missing data given the information was not available. It was unclear in one study (30) whether missing data was problematic, therefore the handling of missing data was rated as 'not addressed'.

A number of studies included additional measures related to the study aims, however, only measures of relevance to the review were included in the quality assessment. There was variation in the quality of psychometric information provided in the studies for the measures. Only four studies (28, 34-35, 37) explicitly described the psychometric properties of the measures and use of such within the target population. Four studies (25, 30, 32, 36) provided some, but not explicit detail with regard to reliability or validity of measures and they were less explicit on whether this generalised to the target population, and five studies (26-27, 29, 31, 33) described minimal detail.

No study reported a power calculation using an effect size estimation for guidance on required sample sizes. Based on the overall analyses conducted to meet the study aims, eleven studies (25-26, 28-29, 31-37) had sufficient participants. Two studies (27, 30) were deemed to have insufficient sample sizes for the main analysis conducted, and this was not acknowledged, resulting in potentially misleading results. It should be noted that these studies also conducted some analyses whereby the sample size was appropriate, for example, Walsh et al. (30) had a large sample for the correlation analysis as relevant for the review. Reporting of analyses and precision of associations across all studies was of adequate to high quality.

Studies varied in methodological strength of identifying and controlling for confounding variables. One study did not address confounding variables (30). The remaining studies ranged from addressing sociodemographic variables to those which conducted assessment of covariates of maltreatment, diagnostic or clinical factors and/or utilised analysis to control for confounding variables. The latter were deemed of higher methodological rigour. Addressing external validity, by interpretation of results related to the theoretical framework, limitations of the study, generalisability and implication of the findings, was of adequate (25-26, 28-29, 32) to high (27, 30-31, 33-37) quality in the included studies.

Table 3. Assessment of Quality for the Included Studies

Study Author and Year	Quality Criteria *								
	1	2	3	4	5	6	7	8	9
Childhood Trauma and/or Maltreatment and Emotion Regulation									
Banducci et al. (2014) (25)	PA	PA	PA	AA	WC	AA	AA	AA	AA
Choi et al. (2014) (26)	AA	NAd	NA	PA	WC	WC	WC	PA	AA
Carvalho Fernando et al. (2014) (27)	WC	NAd	NA	PA	PA	PA	AA	PA	WC
Gratz et al. (2008) (28)	AA	NAd	NA	WC	AA	AA	WC	WC	AA
Van Dijke et al. (2011) (29)	PA	NAd	NA	PA	WC	AA	AA	PA	AA
Walsh et al. (2012) (30)	PA	AA	NAd	AA	PA	AA	AA	NAd	WC
Posttraumatic Stress Disorder or Symptoms and Emotion Regulation									
Cloitre et al. (2009) (31)	PA	NAd	NA	PA	WC	WC	AA	AA	WC
Cloitre et al. (2005) (32)	PA	NAd	NA	AA	WC	WC	AA	AA	AA
Fairholme et al. (2013) (33)	AA	NAd	PA	PA	WC	WC	WC	WC	WC
McDermott et al. (2009) (34)	AA	NAd	NA	WC	AA	AA	WC	AA	WC
Weiss et al. (2013) (35)	WC	NAd	NA	WC	WC	WC	WC	WC	WC
Childhood Trauma and/or Maltreatment, Posttraumatic Stress Disorder or Symptoms and Emotion Regulation									
Johnson & Lynch. (2013) (36)	WC	WC	WC	AA	WC	WC	WC	PA	WC
Weiss et al. (2013) (37)	WC	NAd	NA	WC	WC	WC	WC	WC	WC

Note. WC: well covered (3 points), AA: adequately addressed (2 points), PA: poorly addressed (1 point), NAd: not addressed (0 points), NR: not reported (0 points), NA: not applicable (0 points).

*1: Rationale and theoretical background, 2: sampling strategy and representatives of target population, 3: number of people approached and attrition rates, 4: problematic attrition and handling of missing data, 5: reported validity and reliability of outcome measures, 6: sample size for sufficient power, 7: appropriateness of analysis, 8: precision of associations, 9: internal validity/ management of confounding variables and 10: external validity.

1.5.3 Summary of Main Findings

Childhood Maltreatment and Emotion Regulation

Four of the six studies investigated the relationship between childhood maltreatment and emotion regulation using correlation analysis (26, 28-30). Gratz et al. (28) reported total score of the Childhood Trauma Questionnaire (CTQ) was strongly associated with emotion dysregulation, with a large effect size. Walsh et al. (30) reported individual subscales of the CTQ and found small to medium effect sizes for the association of each type of maltreatment (abuse and neglect) and emotion dysregulation. These studies indicated that greater childhood maltreatment is associated with greater emotion regulation difficulties. Choi et al. (26) investigated only abuse subscales of the CTQ and found that childhood physical abuse (CPA) and childhood emotional abuse (CEA) were positively associated with emotion regulation difficulties, whereas childhood sexual abuse (CSA) was not. The finding that CSA was not significantly associated with emotion dysregulation is contrary to Walsh et al's. (30) finding of a significant correlation with a medium effect size.

One study (29) did not use the CTQ to assess childhood maltreatment. This study reported that childhood maltreatment occurring in the first six years of a child's life was positively associated with emotion dysregulation, but later developmental periods were not. This study also reported that only emotional maltreatment, not physical or sexual maltreatment, was associated with emotion dysregulation, but the effect sizes within this study were small. Differences in findings have emerged between the studies. The two studies (26, 29) that did not find a significant association between childhood sexual abuse and emotion dysregulation used translated measures (i.e.

Korean and Dutch) and clinical outpatient and inpatient samples, whereas Walsh et al. (30) used an American prison population. Variation across population samples, different cultures and translated measures may have contributed to the mixed findings.

Carvalho Fernando et al. (27) examined the potential relationship between childhood maltreatment and emotion regulation using an analysis of variance to compare clinical samples with healthy controls. Clinical samples had significantly greater levels of childhood maltreatment (abuse and neglect) and greater emotion regulation difficulties compared to healthy controls, with reported medium to large effect sizes. Strengths of this study include the use of a comparison healthy control group and control of demographic variables. The generalisability of these findings are however limited due to the use of small clinical samples and large confidence intervals indicating less precision of the reported effect sizes in the analysis of emotion regulation across clinical and non clinical groups.

Four studies (25-28) conducted more sophisticated modelling analysis, using regression or structural equation modelling, relevant to the review. This was secondary analysis in three of the aforementioned studies (26-28). Banducci et al. (25) and Choi et al. (26) examined abuse scales of the CTQ. Choi et al. (26) reported overall childhood abuse significantly predicted emotion dysregulation, whereas Banducci et al. (25) examined specific domains of abuse and found only CEA to significantly predict emotion dysregulation. CPA and CSA did not significantly predict emotion dysregulation. Two studies (27-28) used all subscales of the CTQ. Gratz et al. (28), using only the total score, reported that overall childhood maltreatment significantly predicted emotion dysregulation. Carvalho Fernando et al. (27) analysed each CTQ subscale and indicated that CEA and childhood emotional neglect (CEN) significantly

predicted emotion regulation difficulties, however, CPA, CSA and childhood physical neglect (CPN) did not. Although the study findings are limited by the use of a small sample, they are consistent with Banducci et al's. (25) findings (i.e. of the abuse subscales, only CEA was associated with emotion dysregulation).

The significant associations across a range of studies are suggestive of a linear relationship between childhood maltreatment and emotion dysregulation (i.e. the greater maltreatment, the greater emotion regulation difficulties). There is preliminary evidence to indicate that specific domains of childhood maltreatment may be more salient with emotion dysregulation, although the evidence is not extensive in this review. A primary methodological weakness is the poor acknowledgement and control of confounding variables within the majority of studies. The research is also limited investigating the causal nature of the association.

Emotion Regulation and Adulthood Trauma Symptomatology

Five studies investigated the potential relationship between emotion regulation and PTS symptoms/PTSD (31-35). Of three studies utilising correlation analysis, Cloitre et al. (31) and Fairholme et al. (33) reported significant positive associations between emotion regulation and PTSD, indicating greater emotion regulation difficulties are associated with greater PTSD symptoms. One study (32), using a sample with a history of childhood sexual and/or physical abuse, did not find a significant correlation between emotion regulation and PTSD. The reason for a difference in findings may be the result of methodological variation with the use of different measures and Cloitre et al. (32) used a more strict exclusion criteria based on diagnosis. The exclusion of individuals with severe mental illness, such as bipolar disorder, may have impacted on the findings.

Two studies (34-35), of similar high methodological quality across the majority of quality criteria, utilised comparative analysis methods. All studies revealed that samples with PTSD (or probable PTSD) had greater emotion regulation difficulties compared to those without PTSD, with large effect sizes. However, reported confidence intervals by Weiss et al. (35; see Table 2) have wide parameters indicating an increased uncertainty of the effect size estimates. McDermott et al. (34) and Weiss et al. (35) also examined differences in individual subscales of the Difficulties in Emotion Regulation Scale (DERS). Greater scores, indicating more difficulties, were found on all domains of the DERS, apart from emotional awareness, in samples with PTSD versus without PTSD.

Further analyses conducted by three robust studies (33-35), using various regression models, found that overall emotion dysregulation significantly predicted PTSD. Fairholme et al. (33) also explored the individual subscales of the DERS and found, that whilst controlling for interrelationships among study variables, specific difficulties with controlling impulsive behaviours and difficulties with goal directed behaviours when upset predicted PTSD.

Pertinent to the review, the studies reveal a link between emotion dysregulation and PTS symptoms/PTSD. The cross sectional nature of designs fail to provide evidence of the direction of relationships, for example, whether emotion regulation difficulties lead to increased likeliness of PTS symptoms/PTSD or whether emotion regulation difficulties are an outcome of PTS symptoms/PTSD.

Assessing Multiple Relationships: Childhood Maltreatment, Emotion Regulation and Adulthood Trauma Symptomatology

Two studies (36-37) assessed the associations between the three variables of interest: emotion regulation, childhood maltreatment and adulthood trauma symptomatology. Johnson and Lynch (36) focused on a history of CSA and Weiss et al. (37) considered all abuse subscales. Weiss et al. (37) conducted correlation analysis and identified a moderate positive association between CEA and total emotion regulation difficulties. CSA and CPA were not significantly correlated with emotion dysregulation total, nor was CSA associated with emotion regulation subscales of the DERS. Greater CEA has been associated with greater emotion regulation difficulties by Weiss et al. (37) and two aforementioned studies; Choi et al. (26) and Walsh et al. (30). However, there are ambiguous findings to conclude specifically what domains of childhood abuse are associated with emotion dysregulation. On examination of the DERS subscales, Weiss et al. (37) found greater difficulties in engaging in goal directed behaviour and controlling impulsive behaviour were associated with CPA and CEA. Lack of emotional clarity and effective strategies to manage negative emotions were also associated with CEA.

Johnson and Lynch (36) and Weiss et al. (37) also reported a significant positive association between emotion regulation and PTSD, indicating greater emotion dysregulation is associated with greater PTS symptoms/PTSD. Weiss et al. (37) examined individual subscales of the DERS and reported significant between group differences (probable PTSD versus no PTSD). This study postulated that overall emotion regulation difficulties and domains of poor goal directed behaviour, poor impulse control and lack of effective emotion regulation strategies were greater in the

PTSD group. The study also reported that difficulties controlling impulse behaviour (a subscale of the DERS) fully accounted for the association between CPA and CEA with probable PTSD status. Although only a small effect was reported, the confidence intervals have a small parameter (CI: .01 - .14) indicating greater precision in the reported effect size. Johnson and Lynch (36) focused on only CSA as a form of childhood maltreatment and, having had wider aims, the structural equation modelling incorporated numerous variables. From this, CSA significantly predicted emotion dysregulation and PTS symptoms via the mediation of self blame, and emotion dysregulation and PTS were significantly associated within this model.

Although both of the studies were generally of robust methodical rigour, Johnson and Lynch (36) were weaker in controlling for confounding variables. The studies support the findings that childhood maltreatment, emotion regulation and PTSD are associated. Due to the limited studies and one study incorporating additional variables in the mediation model (36), limited conclusions regarding the specific causal pathways between childhood maltreatment, emotion dysregulation and PTSD can be drawn. A critical limitation of these studies is that neither study addressed neglect in childhood.

1.6 Discussion

The review has provided a qualitative synthesis of literature reporting on the association of general emotion dysregulation with childhood maltreatment and/or PTS symptoms/PTSD.

In support of the hypotheses, there is a general consensus that childhood maltreatment is associated with emotion dysregulation, with studies reporting moderate

to large effect sizes (25-28, 30). The studies investigating sub domains of maltreatment, however, limit conclusions and conceptualise emotion dysregulation as a result of specific types of childhood maltreatment. On examination of domains of childhood maltreatment, the majority of studies focused primarily on abuse types. The results of abuse type and the association with emotion regulation varied amongst the reported findings, although CEA was most consistently found to be associated and predictive of emotion dysregulation. This highlights that although there is strong evidence to suggest that childhood maltreatment impacts negatively on emotion regulation capacity, the examined subscales suggest that specific types of maltreatment may be more salient to emotion dysregulation than others, particularly emotional maltreatment. Given a number of studies only examined abuse and failed to examine neglect domains of maltreatment, the generalisability and conclusions are limited in consideration of all maltreatment types.

Of the studies that examined the association between emotion dysregulation and PTS symptoms/PTSD in adulthood, all bar one consistently reported similar findings in support of the hypotheses. The findings suggest that emotion dysregulation is associated with PTS symptoms and PTSD, emotion dysregulation is greater in PTSD samples compared to samples without PTSD and emotion dysregulation predicts PTSD status. The study that did not report a significant association (32), which was of relatively good methodological rigour, was conducted with a sample that had a history of sexual and/or physical childhood abuse. This would perhaps support the aforementioned findings that not all types of childhood maltreatment are associated with later emotion dysregulation, potentially influencing the development of PTS symptoms/PTSD.

Where effect sizes and confidence intervals were calculated for comparative studies (see Table 2), all studies reported medium to large effect sizes in relation to emotion regulation being more severe in clinical and PTSD samples compared to non-PTSD samples and healthy controls. These results should however be interpreted with some caution as the wide parameters of the confidence intervals would indicate some uncertainty about the precision of the effect size estimation.

Limitations of Included Studies

There is a paucity of evidence investigating the mediating role of emotion regulation in the relationship between childhood maltreatment and PTS symptoms/PTSD in the included samples. The studies that did examine this were methodologically strongest in the broadest range of assessed criteria. They have provided some preliminary evidence to suggest emotion regulation plays a mediating role in the association between childhood maltreatment and PTS symptoms/PTSD; however conclusions are limited due to the lack of comparable studies.

Although the quality assessment indicated a large proportion of studies have methodological strengths and provide reasonably robust findings, a number of limitations in the available and included studies should also be considered. There was considerable difficulty conducting qualitative data synthesis due to the variability in the studies primary aims and relatively few focused solely on the objectives of this review. There was also considerable variability in the studies assessing for different types of childhood maltreatment, making comparisons across results problematic. Within assessment of childhood maltreatment, studies should utilise a measure, such as the CTQ, which allows assessment of all maltreatment domains. Childhood maltreatment is

not often a singular trauma and children are more frequently exposed to repeated victimisation (24). When only abuse or neglect subscales are of relevance to study aims, it will be important to consider controlling for other forms of maltreatment.

The studies are limited by predominantly using retrospective and self-report measures, which gives rise to more tentative conclusions being drawn. All studies were cross sectional in design and relied upon the retrospective reporting of childhood maltreatment, but the current experience of emotion regulation and PTS symptoms. This limits any causal links between childhood maltreatment and emotion dysregulation. Conclusions that can be drawn in relation to the nature of the relationships are also limited by the review relying on the use of correlational and comparative analysis in some studies. For example, whether emotion dysregulation precedes the development of PTS symptoms/PTSD or is a symptom of PTSD. A weakness in a number of the studies was the poor consideration of confounding variables that could influence emotion regulation throughout an individual's life, such as mental health co-morbidities and previous treatment.

Limitations of Review

A number of limitations should also be noted in relation to the review. There is the possibility of publication bias due to the inclusion of only peer reviewed journals and missed findings from not contacting authors for non-reported data. The review did not include studies that examined the influence of treatment, either as an experimental design, which can contribute to theoretical model testing of the relationships between the included variables, or consideration of past treatment within control variables which limit the findings of the review. A narrative approach was used to investigate the nature

of the relationships between emotion regulation and childhood maltreatment and / or PTSD. This approach provides a preliminary exploratory investigation, and a meta analysis for analytical synthesis of the effect sizes for comparison across the studies would be beneficial in the future.

The review focused on general emotion regulation, not specific domains of emotion regulation strategies. Specific domains of emotion regulation strategies have been reviewed in association with a number of mental health psychopathologies (38) and with PTS symptoms (15). These reviews indicate maladaptive emotion regulation strategies (e.g. experiential avoidance), compared to adaptive emotion regulation strategies (e.g. acceptance), are more strongly associated with PTS symptoms and psychopathologies. Further research would be required to explore the specific emotion regulation constructs for comparability across particular populations and to examine developmental causal links. Lastly, within the studies assessing PTS symptoms/PTSD, there was some variation in what the traumatic event was, and whether this specifically occurred in childhood. Although exclusively type 1 trauma or traumatic events from military populations, following war, natural disasters and medical procedures were excluded, the results are not wholly representative of causal pathways within the context of having only experienced childhood maltreatment. It will be important for future studies to consider the implications of other trauma beyond childhood.

Strengths of the Review

Despite the limitations, the review investigated the unique contribution of emotion regulation in relation to childhood maltreatment, adulthood trauma symptomatology and the relationship of emotion regulation between these two variables. The included

literature was assessed by two reviewers with good inter-rater consistency, thus increasing the reliability of quality assessment and review findings.

Although the review aimed to evaluate only general emotion dysregulation, a number of the included studies also reported on specific domains of emotion regulation strategies. These results highlight that specific maladaptive emotion regulation strategies are more commonly associated with PTS symptoms/PTSD and are greater in samples with PTSD than those without PTSD. Although this is a tentative conclusion drawn from only a few of the included studies which utilised the DERS, the findings are consistent with Seligowski et al's. (15) meta-analysis that concluded maladaptive emotion regulation strategies are more strongly associated with PTS symptoms.

A previous meta-analysis highlighted that reviewing studies inclusive of all populations can limit the external validity of findings (15). This review therefore addressed this by specifically focussing on clinically related samples to increase the degree of generalisability of findings. Importantly, the review highlighted a gap of how few studies exist using clinically related and forensic samples contributing to the understanding of underlying psychopathology. This is crucial in the understanding and direction of treatments within clinical practice.

Clinical Implications

Clinicians should be aware that individuals who have experienced childhood maltreatment are more likely to have difficulties with emotion regulation and are more vulnerable to developing PTS symptoms/PTSD. As difficulties with emotion regulation are not only related to PTSD, but a number of psychopathologies, it will be an area worthy of assessment and possible avenue for intervention. As recommended within

psychological treatment, emotion regulation work is a key component of stabilisation prior to trauma focused intervention (8, 39).

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Declaration of Interest

All authors declare they have no conflict of interests.

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Chapter 2: Journal Article

2.1 Title Page

Childhood Maltreatment and Posttraumatic Stress Symptoms: The Role of Emotion Regulation and Social Problem Solving.

(Written in accordance with the author submission guidelines for Journal of Traumatic Stress, see Appendix 3)

Short title for running head:

VARIABLES THAT AFFECT TRAUMA SYMPTOMATOLOGY IN A FORENSIC
POPULATION.

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2.2 Abstract

The study examined the relationship between childhood maltreatment (emotional abuse, physical abuse, sexual abuse, physical neglect and emotional neglect) and posttraumatic stress (PTS) symptoms, and whether emotion regulation and social problem solving mediate the relationship. Fifty two male forensic mental health patients receiving care in the community, low secure or medium secure wards completed self-report measures of the Childhood Trauma Questionnaire, Difficulties in Emotion Regulation Scale, Social Problem Solving Inventory-Revised: Short-Form and the Post Traumatic Stress Disorder Checklist-Civilian Version. Overall childhood maltreatment, childhood emotional abuse, sexual abuse and emotional neglect were associated with greater emotion dysregulation. Childhood sexual abuse, emotional neglect and physical neglect were associated with poorer social problem skills. With the exception of childhood physical abuse, all forms of childhood maltreatment, emotion dysregulation and poor social problem solving were correlated with greater trauma symptomatology. Mediation analysis indicated that both emotion dysregulation and poor social problem solving mediated the relationship between childhood emotional neglect and PTS symptoms in adulthood. The study gives further insight into the forensic psychopathology and highlights the relevance of emotion regulation and social problem solving in the treatment of PTS symptoms.

2.3 Introduction

The connection between childhood maltreatment and Posttraumatic Stress (PTS) symptoms/Posttraumatic Stress Disorder (PTSD) in adulthood is well established (Pratchett & Yehuda, 2011), with researchers now increasingly investigating the processes and mechanisms that explain the link. Childhood maltreatment (emotional, physical and sexual abuse and emotional and physical neglect) was reported in 36% of a forensic inpatient sample, with sexual and physical abuse, and emotional neglect being the most common (Spitzer et al., 2001). PTS symptoms/PTSD are generally higher in forensic hospitalised populations and reported at 36% to 44% (Spitzer, Chevalier, Gillner, Freyberger, & Barnow, 2006; Spitzer et al., 2001), in comparison to between 4% and 21% in prison populations (Goff, Rose, E., Rose, S., & Purves, 2007) and between 6% and 8% in the general population (Kessler, Petukhova, Sampson, Zaslavsky, & Wittchen, 2012; Norris & Slone, 2013). The investigation of causal links to explain the relationship between childhood maltreatment and adulthood PTS symptoms/PTSD is limited in the forensic population, which has focused predominantly on descriptive outcomes of maltreatment and PTSD.

Childhood maltreatment, especially repeated and prolonged maltreatment, is associated with numerous psychological and neurobiological developmental consequences (Cook et al., 2005). Historically, childhood physical and sexual abuse dominated the literature, however, maltreated children are often the victim of numerous forms of abuse and neglect (Behl, Conyngham, & May, 2003). Trends in research indicate that emotional maltreatment has received far less attention than other forms of

maltreatment, yet it can have similar enduring detrimental consequences on a child's development and future psychopathology (Egeland, 2009).

Although potential mediators between childhood maltreatment and PTSD are not well understood, there is evidence to indicate the mediating role of emotion regulation (Burns, Jackson, & Harding, 2010; Weiss, Tull, Lavender, & Gratz, 2013). Emotion regulation has been conceptualised as a multidimensional construct that allows the moderation of emotional states. Research suggests the capacity of emotion regulation develops in early childhood, which can be adversely affected by childhood maltreatment. In an interpersonal context, the quality of relationships with primary caregivers is thought to be an important antecedent to a child's ability to later regulate emotions (Calkins & Hill, 2007). A secure attachment with synchronous emotional exchanges develops adaptive regulation of emotional states, whereas poor parental socialisation, less validation of a child's emotional responses and poor modelling of adaptive emotion regulation in insecure attachments leads to the development of emotion regulation difficulties. Maltreatment minimises the opportunity for a child's brain to develop to full potential with higher functioning processes, thus emotion regulation capacity is compromised (Cook et al., 2005).

Emotion dysregulation can lead to the development and maintenance of future negative psychopathologies, such as Bipolar Disorder, Substance misuse, Eating Disorders and PTSD (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Reliance on maladaptive emotion regulation strategies, such as avoidance of emotion, may initially be adaptive, however, the inability to regulate emotions may contribute to one's perception that emotions and environments are unpredictable and uncontrollable reinforcing negative appraisals of the trauma and resultant threat response (Ehlers &

Clark, 2000). In the long term, maladaptive coping strategies, such as emotion dysregulation, therefore result in problems of processing the trauma and change fails to occur by maintenance of fear acquisition and heightened distress (Ehlers & Clark, 2000). This can contribute to the development of PTS symptoms/PTSD (Ehlers & Clark, 2000). Emotion dysregulation is recognised as a risk factor in the development of PTSD (Ehring & Quack, 2010), with greater emotion regulation difficulties related to more severe PTS symptoms/PTSD (Tull, Barrett, McMillan, & Roemer, 2007), and emotion regulation training is recommended within the treatment of PTSD (Scottish Government & NHS Education Board for Scotland, 2011; Tull et al., 2007).

Social problem solving capacity, like emotion regulation, is understood to be both the outcome of previous experiences, as well as a predictor of current and future psychopathology (Nezu, A., Nezu, C., & D'Zurilla, 2013). Social problem solving is conceptualised as a multidimensional construct comprising problem orientation and problem solving styles to cope with difficult situations encountered in everyday living (D'Zurilla, Nezu, & Mayeu-Olivares, 2002). These encompass an individual's ability, awareness, appraisal and self-efficacy in dealing with problems, as well as the way in which problems are approached and what type of strategies are applied to deal with them.

Similar to the development of emotion regulation capacity, social problem solving difficulties may stem from insecure attachment style, negative external environments and reduced neurological development of higher functioning cognitive processes in the cortex, which impede on a child's opportunity to learn and develop efficient problem solving skills (Nezu et al., 2013). Maltreated children are more likely to develop insufficient methods of processing social information, have increased

difficulties attending to social cues, display antisocial behaviour and lack effective strategies in dealing with interpersonal social problems (Dodge, Pettit, & Bates, 1994; Dodge, Pettit, Bates, & Valente, 1995).

There is evidence to suggest a mediating role of social problem solving in the relationship between stressful life events and psychopathology (Kant, D'Zurilla, & Maydeu-Olivares, 1997). Social problem solving has been conceptualised in the relational stress model as a coping mechanism that reduces negative effects of stress and can increase adaptive functioning, which is integral to successful psychological and behavioural adjustment in life (Antonowicz & Ross, 2005). Deficits in social problem solving have been found to predict poorer behavioural and psychological outcomes, such as, anxiety, depression, substance misuse, offending behaviour, schizophrenia and PTSD (Nezu et al., 2013). Research has shown that individuals with PTSD show poorer problem solving compared to those without PTSD (Sutherland & Bryant, 2008), and PTSD symptoms predict poorer problem solving following a history of traumatic exposure (Kasckow et al., 2012). The direction of causality is, however, unclear.

Social problem solving difficulties are more prevalent in psychiatric and forensic populations in comparison to the general population (D'Zurilla et al., 2002). Social problem solving skills training / problem solving therapy is often included, and shown to be effective, within psychotherapeutic treatment programmes delivered to forensic populations and for those who are suffering from PTSD (Nezu et al., 2013). This suggests social problem solving deficits play a role in the development and maintenance of psychopathology.

There has been an increase in empirical work to understand the processes and mechanisms that explain the link between childhood maltreatment and PTS

symptoms/PTSD in adulthood. This is, however, limited in a forensic population whereby childhood maltreatment and PTSD are highly prevalent. Within the forensic setting, Johnson and Lynch (2013) and Walsh, Gonsalves, Scalora, King and Hardyman (2012) are the only two¹ studies that have investigated the relationship between childhood maltreatment and emotion dysregulation. Both studied a female population sample, highlighting a need for research to be conducted with a male forensic population. Johnson and Lynch (2013) and Weiss et al. (2013) were two identified studies that conducted theoretical model testing to examine the association between childhood maltreatment, emotion dysregulation and PTSD in a forensic (Johnson & Lynch, 2013) and substance misuse (Weiss et al., 2013) sample. Neither study examined the role of social problem solving in the model. Johnson and Lynch (2013) conducted more sophisticated analyses with additional variables in the model and only childhood sexual abuse was examined. A limitation to prior investigations of childhood maltreatment was the failure to assess for all domains of maltreatment, or control for those that were not relevant to the study's aims. This study addressed this by investigating abuse and neglect domains of maltreatment.

Aims and Hypotheses

Emotion regulation and social problem solving have been evidenced as important factors related to childhood maltreatment and PTS symptoms/PTSD. The purpose of this study was to integrate emotion regulation and social problem solving into one model, in an attempt to understand the etiological processes in the relationship

¹ Duplicated data in multiple publications and studies using between groups comparative analyses have not been included.

between childhood maltreatment and the development and maintenance of PTS symptoms/PTSD in a forensic population.

The objective was to investigate the association between experiences of childhood maltreatment (emotional abuse, physical abuse, sexual abuse, emotional neglect and physical neglect), the subsequent development of social problem solving skills and emotion regulation, and the existence of adult trauma symptomatology in an adult male forensic mental health population. Based on the well documented link between childhood maltreatment and PTS symptoms/PTSD (Pratchett & Yehuda, 2011), it was hypothesised that childhood maltreatment will be associated with more severe adulthood trauma symptomatology.

Research suggests particular types of abuse and/or neglect are more salient in the development of emotion regulation difficulties and trauma psychopathology, although the findings are mixed. Consistent findings appear to be found with childhood sexual abuse (CSA) (Kim & Cicchetti, 2010; Ullman, Peter-Hagene, & Relyea, 2014) and childhood emotional abuse (CEA) and neglect (CEN) (Banducci, Hoffman, Lejuez, & Koenen, 2014; Carvalho Fernando et al., 2014). It was therefore hypothesised that CSA, CEA and CEN will be positively associated with emotion dysregulation and adult trauma symptomatology. No hypotheses were made regarding the associations between type of maltreatment and social problem solving ability given the paucity of literature in this area.

The study's primary aim was to investigate whether childhood maltreatment is indirectly associated with trauma symptomatology through mediation by emotion regulation and/or social problem solving skills. It was hypothesised that social problem

solving and emotion regulation will mediate the relationship between childhood maltreatment and adulthood trauma symptomatology.

No study to date has investigated emotion regulation and social problem in one model to understand the links between childhood maltreatment and adulthood trauma symptomatology. It is proposed this research will attempt to address a gap in the literature and may contribute to the understanding of a forensic psychopathology which is beneficial to both research and clinical practice. The proposed mediation model is presented in Fig. 2.

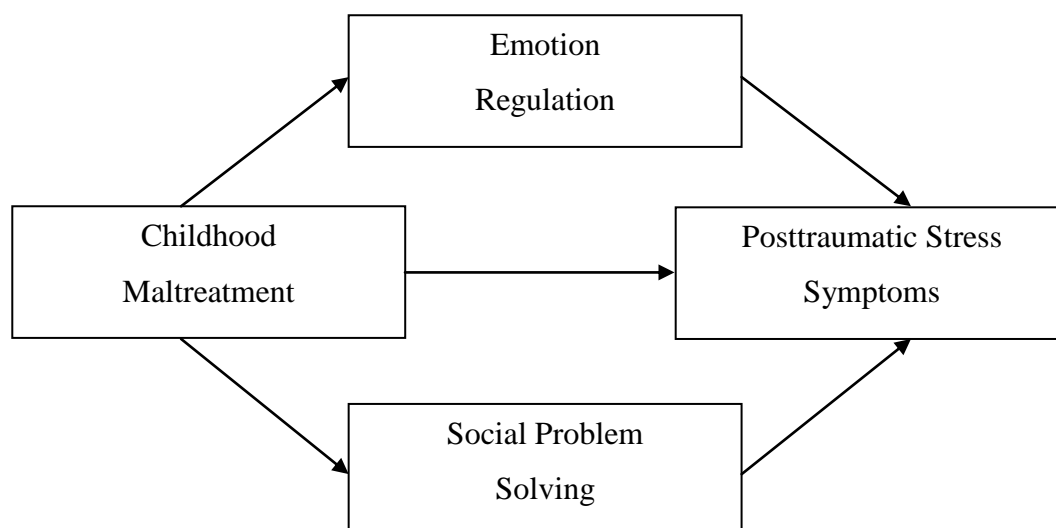


Fig. 2. Proposed mediation model

2.4 Method

Participants

Participants were 52 English speaking adult males. Participants were receiving care from community, low and medium secure forensic mental health services across NHS Tayside and Fife, with an age range of 20 to 68 years ($M = 40.96$, $SD = 11.38$).

Measures

Demographic Information

Collated demographic information comprised; age, current level of security required for care (i.e. community / low secure / medium secure), the number of years the participant had required this level of security, the total number of years the participant had been receiving care from Forensic Mental Health Services and if the participant had previously been hospitalised in a high secure hospital.

Demographic information was provided by staff (e.g. named nurse) after the participant provided informed signed consent and completed the study.

Childhood Maltreatment

The Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) is a 28-item self-report questionnaire that assesses five forms of childhood trauma; sexual, emotional and physical abuse, and emotional and physical neglect. Each item is rated using a five point Likert scale, from 1 (*never true*) to 5 (*very often true*) to assess the frequency of childhood trauma. For detection of possible underreporting of traumatic events by the respondent, three of the questionnaire items assess minimisation/denial. Corresponding item scores are summed to gain subscale scores for each of the five forms of childhood trauma and all items summed to gain an overall score of childhood traumatic experiences. Bernstein and Fink (1998) specify recommended cut off scores to rate the severity of each trauma type and higher scores correspond with greater levels of childhood maltreatment.

The CTQ has been well established and has demonstrated good reliability and validity with a broad range of clinical and community populations (Bernstein & Fink,

1998; Bernstein et al., 2003; Scher, Stein, Asmundson, McCreary, & Forde, 2001). Internal consistency in the present sample for each subscale was; CSA (.94), CEA (.86), CPA (.86), CEN (.88) and CPN (.68).

Emotion Regulation

The Difficulties in Emotional Regulation Scale (DERS; Gratz & Roemer, 2004) is a standardised 36-item self-report questionnaire that measures emotion regulation abilities. The DERS comprises of six subscales that relate to the dimensions of emotion regulation: non-acceptance of emotional response, difficulties engaging in goal directed behaviour, difficulties controlling impulsive behaviours, lack of emotional awareness, limited access to emotional regulation strategies and lack of emotional clarity. Respondents rate the frequency in which each statement applies to themselves using a five point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). Corresponding item scores are summed to gain subscale scores and all items are summed to gain an overall score of emotion regulation abilities. Higher scores relate to greater emotion regulation difficulties.

The DERS has demonstrated good test-retest reliability, high internal consistency (Cronbach's $\alpha = .93$) and adequate construct and predictive validity (Gratz & Roemer, 2004). The DERS is commonly used across a range of population samples and has demonstrated validity in clinical populations with severe mental illness (Fowler et al., 2014). Internal consistency obtained for the total score in the present sample was .88.

Social Problem Solving

The Social Problem Solving Inventory-Revised: Short Form (SPSI-R:S; D’Zurilla et al., 2002) is a 25-item self-report that measures social problem solving ability. The SPSI-R:S consists of five dimensions which include two adaptive social problem solving processes; positive problem solving orientation and rational problem solving, and three dysfunctional problem solving processes; negative problem orientation, impulsivity/carelessness style and avoidance style. Respondents rate how true each statement is to themselves on scale, from 0 (*not at all true*) to 4 (*extremely true*). Subscale scores and/or overall social problem solving ability can be calculated using the authors given formula. Lower scores correspond with poorer social problem solving skills.

The SPSI-R:S has been used across a wide range of populations for clinical and research purposes, demonstrating good reliability and strong structural, concurrent, predictive, convergent and discriminant validity (D’Zurilla et al., 2002). The short version is commonly used in research when several measures are being administered (D’Zurilla et al., 2002). Cronbach's alpha for total score was .81 in the present sample.

Trauma Symptomatology

The Post Traumatic Stress Disorder Checklist – Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) is a 17-item self-report measure that assesses post traumatic symptoms. With reference to ‘stressful experiences’, respondents rate how much each symptom has been a problem over the past month on a 5 point Likert scale, from 1 (*not at all*) to 5 (*extremely*). A total score of severity is derived from the sum of all items, with higher scores corresponding to greater severity of symptoms.

The PCL-C has strong psychometric properties; internal consistency, test-retest reliability, convergent validity and discriminant validity, across community and clinical samples (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). Internal consistency of .87 was obtained for the total score in the present sample.

Procedure

Ethical approval was granted by the East of Scotland Research Ethics Committee, NHS Tayside. Eligible patients were provided written information about the study by a familiar member of the staff team. Eligible patients were over 18 years of age, fluent in English and deemed able to give informed consent by qualified clinical staff. Patients were excluded if they had a diagnosed learning disability, an organic disorder that would impair their ability to provide informed consent or understand and complete the questionnaires, were under the influence of illicit substances, were in a distressed state or experiencing an acute psychotic episode. The chief investigator met with patients who expressed an interest in participating to further discuss the study and gain informed consent for participation. The chief investigator met with 60 potential participants. Fifty two participants (87%) completed the four self-report questionnaires with relevant assistance from the chief investigator, for example to read the question items if participants had literacy difficulties. Testing took approximately 30 minutes. Each participant was given the opportunity to discuss their participation in the study and raise any concerns or difficulties they experienced during completion of the study. No issues were raised during testing.

Data Analyses

Analyses were conducted using Statistical Package for Social Sciences (SPSS, version 21). A series of parametric and non-parametric ANOVAs, t-tests and correlations were conducted to explore the impact of the demographic variables on the outcome measures to identify potential covariates for subsequent analyses. Partial correlations using Pearson's correlation and Spearman's Rho were conducted to examine the relationships among the outcome measures. Spearman's Rho partial correlations were conducted by syntax coding in SPSS.

Multiple mediation analysis was conducted using the macro 'PROCESS' (downloadable from: <http://www.processmacro.org/download.html>). PROCESS runs simultaneous regressions to test the direct and indirect effects of an independent variable on the dependent variable with one or more mediators. Bias corrected bootstrapping, based on 5,000 samples, was used to estimate standard errors and bias corrected confidence intervals for the indirect effects. The mediated effect is considered significant if the confidence interval, set at 95%, does not contain a zero (Hayes, 2009). Mediation analysis using bootstrapping does not require a specific sample size, however, Fritz and MacKinnon (2007) proposed estimated sample sizes to detect mediated effects. It was estimated that a minimum sample size of 71 was required, with a medium effect size, to achieve a power of 0.8 (Fritz & MacKinnon, 2007).

2.5 Results

Population Characteristics

The means and standard deviations for demographic characteristics and measures are presented in Table 4. In the current sample, 24 (46%) participants were receiving care in

the community, 16 (31%) in low secure wards and 12 (23%) in medium secure wards. Of the 52 participants, 16 (31%) had previously been hospitalised in a high secure forensic hospital.

Table 4. Means and Standard Deviations of Demographic Characteristics and Measures

	Mean	Standard Deviation
Age	40.96	11.38
Years in current level of security	3.86	3.76
Years in FMHS	9.74	9.17
Measure		
CTQ Total	47.75	21.07
Childhood emotional abuse	10.38	5.46
Childhood physical abuse	8.75	4.95
Childhood sexual abuse	8.38	5.47
Childhood emotional neglect	11.52	5.23
Childhood physical neglect	8.71	4.25
DERS Total	75.54	18.71
SPSI-R:S Total	98.46	14.67
PCL-C Total	34.6	11.80

Note. FMHS = forensic mental health services, CTQ = Childhood Trauma Questionnaire, DERS = Difficulties in Emotional Regulation Scale, SPSI-R:S = Social Problem Solving Inventory-Revised: Short, PCL-C = Post Traumatic Stress Disorder Checklist – Civilian Version.

Prevalence of Maltreatment, Social Problem Solving Difficulties and PTSD

Using Bernstein and Fink's (1998) recommended cut-off scores to indicate the presence of abuse and neglect, 29 participants (55.8%) reported CEA (≥ 9) and CEN (≥ 10), 25 (48.1%) reported CPN (≥ 8), 22 (42.3%) reported CPA (≥ 8) and 20 (38.5%) reported CSA (≥ 6). In accordance to recommended screening scores of 36 and above on the PCL-C (VA National Center for PTSD, 2014), 18 (34.6%) participants were indicated

to have PTSD. Of the 52 participants, 35 (67.3%) scored in the average range of social problem solving abilities, 9 (17.3%) scored above average and 8 (15.4%) scored below the population group average.

Exploratory Analyses

Exploratory analyses revealed no significant relationships between the demographic variables; age, number of years in current level of security and total years in Forensic Mental Health Services (FMHS), and the outcome variables; CTQ, DERS, SPSI-R:S and PCL-C total scores. No significant differences were found for current level of security and previous hospitalisation in a high secure ward, and PCL-C, SPSI-R:S and DERS total score. Those that had previously been hospitalised in a high security ward had significantly greater scores of CTQ total ($U = 183.5, p \leq .05, r = .286$).

Analysis of subscale scores on the CTQ revealed significant relationships between CSA and total years in FMHS ($r = .330, p \leq .01$). Individuals that had previously been hospitalised in a high security ward had significantly greater scores on CPA ($U = 187.0, p \leq .05, r = .286$) and CSA ($U = 145.0, p \leq .001, r = .429$). Correlations highlighted collinearity between the demographic variables ($r = .5, p \leq .001$). Total years in forensic mental services was deemed to be the most clinically relevant potential confounding variable, thus was included as a covariate in subsequent analysis.

Correlations

To establish the basic relationships between variables, partial correlations among measures (whilst controlling for years in FMHS) were conducted (Table 5). CTQ total

score, CEA, CSA and CEN was positively correlated with DERS, indicating higher maltreatment scores were associated with greater emotion dysregulation. CSA, CEN and CPN were negatively correlated with SPSI-R:S, indicating higher scores of maltreatment were associated with poorer social problem solving skills. With the exception of CPA, all forms of childhood maltreatment, DERS and SPSI-R:S were correlated with PCL-C. This indicated greater maltreatment, greater emotion dysregulation and poorer social problem solving was associated with greater trauma symptomatology.

Table 5. Partial Correlations Among Variables Controlling for Years in Forensic Mental Health Services

	CTQ Total	CEA	CPA	CSA	CEN	CPN	DERS	SPSI-R:S	PCL-C
CTQ Total	-								
CEA	.884***	-							
CPA	.762***	.670***	-						
CSA	.645***	.543***	.546***	-					
CEN	.842***	.691***	.430**	.370**	-				
CPN	.859***	.720***	.559***	.468**	.782	-			
DERS	.302*	.297*	.158	.645***	.326*	.172	-		
SPSI-R:S	-.236	-.115	.053	-.311*	-.318*	-.277*	-.622***	-	
PCL-C	.351*	.379**	.115	.413**	.274*	.292*	.659***	-.494***	-

Note. CTQ = Childhood Trauma Questionnaire, CEA = childhood emotional abuse, CPA = childhood physical abuse, CSA = childhood sexual abuse, CEN = childhood emotional neglect, CPN = childhood physical neglect, DERS = Difficulties in Emotional Regulation Scale, SPSI-R:S = Social Problem Solving Inventory-Revised: Short Form, PCL-C = Post Traumatic Stress Disorder Checklist – Civilian Version.

* $p \leq 0.05$

** $p \leq 0.01$

*** $p \leq 0.001$

Mediating Role of Emotion Regulation and Social Problem Solving

Whilst controlling for total years in forensic mental health services, Emotion dysregulation and social problems solving did not mediate, nor were significant indirect effects found in the relationship between CTQ, CEA, CSA, CPA and CPN, and PCL-C.

Regression analyses revealed that CTQ, CEA, CSA, CPA and CPN did not significantly predict DERS or SPSI-R:S. PCL-C was regressed on to CTQ, emotion dysregulation and poor social problem solving. CTQ ($b = .12$, $t = 2.10$, $p < .05$), DERS ($b = -.22$, $t = -2.07$, $p < .05$) and SPSI-R:S ($b = -.22$, $t = -2.07$, $p < .05$) predicted PCL-C ($F(4, 47) = 13.03$, $p < .001$). PCL-C was regressed on to CSA, emotion dysregulation and poor social problem solving, revealing CSA ($b = .62$, $t = 2.7$, $p < .01$), DERS ($b = .28$, $t = 3.54$, $p < .001$) and SPSI-R:S ($b = -.21$, $t = -2.03$, $p < .05$) significantly predicted PCL-C ($F(4, 47) = 14.48$, $p < .001$). Similar results were revealed for CEA ($b = .52$, $t = 2.36$, $p < .05$), DERS ($b = .27$, $t = 3.26$, $p < .01$) and SPSI-R:S ($b = -.23$, $t = -2.20$, $p < .05$) predicting PCL-C ($F(4, 47) = 13.58$, $p < .001$). PCL-C was regressed on to CPN, DERS and SPSI-R:S. Only DERS ($b = .30$, $t = 3.52$, $p < .01$) predicted PCL-C ($F(4, 47) = 11.51$, $p < .001$). PCL-C was regressed on to CPA, DERS and SPSI-R:S. Similarly, only DERS ($b = .28$, $t = 3.32$, $p < .01$) predicted PCL-C ($F(4, 47) = 11.83$, $p < .001$).

As shown in Table 6 and Fig 3, mediation analysis revealed that whilst controlling for years in forensic mental health services, CEN significantly predicted trauma symptomatology ($F(2, 49) = 3.6$, $p < .05$). A significant direct effect was found between CEN and emotion dysregulation ($F(2, 49) = 3.34$, $p < .05$) and poor social problem skills ($F(2, 49) = 3.11$, $p \leq .05$). PCL-C was regressed on to CEN, emotion dysregulation and poor social problem solving ($F(4, 47) = 11.40$, $p < 0.01$). The direct link between CEN and PCL-C was not significant after controlling for emotion

dysregulation and social problem solving, suggesting emotion dysregulation ($t = 3.26$, $p < 0.05$) and social problem solving ($t = -2.06$, $p < 0.05$) account for the association between CEN and adulthood trauma symptomatology.

Bias-corrected bootstrap confidence intervals indicated significant indirect effects of CEN on trauma symptomatology through mediation variables; emotion dysregulation and poor social problem solving (see Table 7).

Table 6. Mediation Regression Analyses

Predictor	ΔR^2	Coefficient	SE	T	P
Model 1: PCL-C as outcome					
Constant	0.49	24.12	4.27	5.64	<.001
CEN		0.79	0.30	2.60	$\leq .01$
Model 2: Emotion Dysregulation as outcome					
Constant	0.12	59.21	6.81	8.70	<.001
CEN		1.17	0.48	2.43	<.05
Model 3: Social problem solving as outcome					
Constant	0.11	110.65	5.36	20.63	<.001
CEN		-0.92	0.38	-2.43	<.05
Model 4: Total effect with PCL-C as outcome					
Constant	0.13	32.34	15.84	2.04	<.05
Emotion dysregulation		0.28	0.09	3.26	<.05
Poor social problem solving		-0.22	0.11	-2.06	<.05
CEN		0.26	0.25	1.01	.32

Note. CEN = childhood emotional neglect, PCL-C = Post Traumatic Stress Disorder Checklist – Civilian Version.

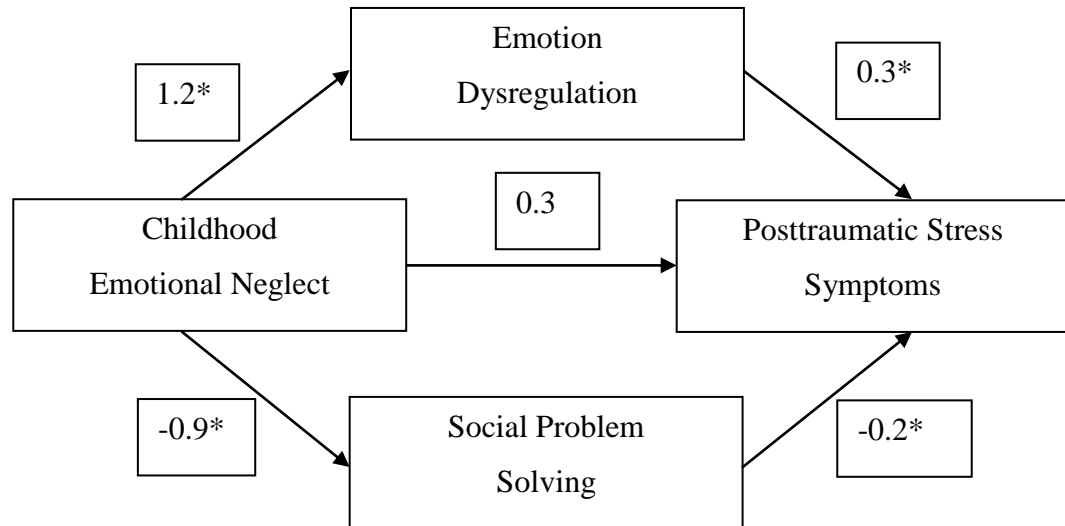


Fig. 3. Multiple mediation model.

* significant 0.05

Table 7. Bootstrapped Indirect Effects on Trauma Symptomatology through Mediators

Mediator	Effect	SE	Bootstrapping percentile 95CI	
			Lower	Upper
Emotion dysregulation	0.33	0.19	0.05	0.78
Poor social problem solving	-0.21	0.15	0.01	0.64

2.6 Discussion

The prevalence of PTSD in forensic populations is considerably higher than community populations (Kessler et al., 2012; Spitzer et al., 2006), yet there is a paucity of literature in forensic populations to examine the causal pathways in the development and maintenance of PTSD. This is crucial for understanding the psychopathology of trauma in a forensic population and in the application of appropriate treatments. The current

study investigated the role of emotion regulation and social problem solving in the relationship between childhood maltreatment and adulthood trauma symptomatology.

In support of the hypotheses, significant correlations were found between overall childhood maltreatment, childhood sexual abuse (CSA), childhood emotional abuse (CEA) and childhood emotional neglect (CEN), and emotion dysregulation. The results support the evidence that overall childhood maltreatment is associated with emotion dysregulation (Gratz, Tull, Baruch, Bornovalova, & Lejuez, 2008). Previous research indicates mixed results in clinically related samples with regards to what type of maltreatment relates to emotion dysregulation. Walsh et al. (2012) found that all individual domains of abuse and neglect correlated with emotion dysregulation, whereas others have found that only CEA (Banducci et al., 2014; Weiss et al., 2013), or CEA and childhood physical abuse (CPA) (Choi, J., Choi, Y., Gim, Park, J., & Park, S, 2014) were correlated with emotion dysregulation. A limitation to Banducci et al's. (2014), Choi et al's. (2014) and Weiss et al's. (2013) studies were they did not include or control for neglect. Carvalho Fernando et al. (2014) examined all domains of maltreatment (childhood sexual, physical and emotional abuse, and physical and emotional neglect) and found that only CEA and CEN predicted emotion dysregulation in a clinical population. Variation in the results may be associated to different populations or whereby some trauma types are more prevalent.

Due to the paucity of literature, no hypotheses were made regarding the type of maltreatment and association with social problem solving. This study found CSA, CEN and CPN were significantly correlated with poorer problem solving skills. With the exception of CPA, all forms of maltreatment were positively associated with adulthood trauma symptoms. Consistent with previous literature, both poor problem solving

(Sutherland & Bryant, 2008) and emotion dysregulation (Seligowski, Lee, Bardeen, & Orcutt, 2015; Weiss et al., 2013) were associated with greater trauma symptoms.

Emotional maltreatment has received less focus in comparison to other forms of maltreatment in past literature (Egeland, 2009). CSA, CPA and CEN have been reported to be the most common forms of childhood maltreatment experienced by 36% of forensic inpatients (Spitzer et al., 2001). Comparable with Spitzer et al. (2001), prevalence of CPA (42.3%) and CSA (38.5%) were higher in this study. In this study, CEA, CEN and CPN were the most common maltreatment types reported, signifying the prevalence of emotional maltreatment within the forensic population. The present study found support for the mediating role of emotion regulation and social problem solving in the relationship between CEN and adulthood trauma symptomatology. The results conveyed a large effect in the initial model of emotional neglect accounting for 49% of PCL-C, whereas the final model including CEN, emotion regulation and social problem solving conveyed a medium effect accounting for only 13% of PCL-C. Emotion regulation and social problem solving were significant mediators, however, the confidence intervals fall within a slightly wider than ideal parameter indicative of less precision in the reported medium effect size. These results support findings that have conveyed the importance of emotional maltreatment in the development of psychopathologies, including PTSD (Egeland, 2009).

Childhood maltreatment, CSA, CEA, emotional dysregulation and social problem difficulties were found to uniquely predict trauma symptomatology. Only CPA and CPN were uniquely predictive of trauma symptomatology when emotion dysregulation and social problem solving were included in the regression model. These

results highlight additional significant and clinically relevant relationships between childhood maltreatment and PTS symptoms in a forensic population.

Although the present study extends the literature on the relationships between maltreatment, emotion regulation, social problem solving and trauma symptoms, several limitations need to be considered. Demographic information, such as ethnicity and diagnosis were not collected. This will limit comparison across other studies with a forensic population and may have been confounding variables in the analyses. The pre-planned sample size was not achieved, thus the study was underpowered and restricted the analyses conducted. Multiple analyses were conducted due to the sample size which may have increased the likelihood of type 1 errors. Within the analyses conducted it is also possible that this study failed to find effects due to a small sample increasing the likelihood of type 2 errors. Maltreated children often suffer from revictimisation and there are likely interactions between types of abuse and neglect (Cloitre, Stolbach, Herman, Van der Kolk, Pynoos, Wang, & Petkova, 2009). With an increased sample size, it would be beneficial to run the mediation model with multiple independent variables to include all domains of childhood maltreatment. This would allow the consideration of all forms of maltreatment and cumulative impacts of maltreatment in the aetiology of trauma psychopathology.

There are limitations and mixed findings regarding the reliability of self-report measures, particularly in reporting maltreatment histories and within the forensic population. Individual perception and cognitive appraisal of a traumatic event will influence whether it is perceived as negative, neglectful or abusive, which may influence self-reporting. For example, Fondacaro, Holt and Powell (1999) found that 41% of prisoners, who had been sexually abused, did not consider themselves to have

experienced childhood abuse. The percentage of participants reporting childhood maltreatment and PTSD symptoms in the present study were comparative to other studies with forensic inpatients (Spitzer et al., 2001; Sarkar, Mezey, Cohen, Singh, & Olumoroti, 2005). With reliance on self-report measures of abilities, such as emotion regulation and social problem solving, an individual's perception of their own experiences and abilities is being measured rather than the application of reported abilities. This may have influenced either under or overestimation of reported abilities in the study.

There is evidence that suggests particular types of childhood maltreatment are associated with emotion dysregulation (Carvalho Fernando et al., 2014) and specific emotion regulation components are associated with PTSD (Seligowski et al., 2015). Similarly, specific social problem solving orientations and styles are suggested to be more salient in the development of psychopathologies. For example, McMurran and Christopher (2009) found that only negative problem orientation of social problem solving was a predictor of anxiety and depression in male prisoners. Including all subscales of the emotion regulation and social problem solving measures to examine the effects of maltreatment on these constructs, and the role they play in the development and maintenance of PTSD would be a worthy consideration in future research.

To date, this is the first empirical study that has investigated emotion regulation and social problem solving in one model to understand the links between childhood maltreatment and the development and maintenance of adulthood trauma symptomatology. A limitation of prior investigations of childhood maltreatment has been the failure to incorporate all forms of abuse and neglect when assessing for maltreatment. Including all domains of childhood maltreatment in this study addressed

this limitation. Studies of the aetiology and consequences of maltreatment highlight the literature is insufficient in accounting for the complex processes that result in outcomes of severe psychopathology. Theoretical model testing has attempted to address causal inferences between variables, however there is a vast complexity of interacting variables in psychopathologies, such as PTSD. The use of retrospective data limits conclusions being drawn about whether the development of emotion regulation and social problem solving deficits are the result of childhood maltreatment alone or if these are symptoms of PTSD.

This study gives further insight into the relationship between childhood maltreatment and trauma symptomatology. It suggests that emotion dysregulation and poor social problem solving mediate the relationship between childhood emotional neglect and trauma symptomatology in a forensic population. The results identify high prevalence of childhood maltreatment and trauma symptomatology and emphasise there is a clinical need for the identification and treatment of PTS symptoms/PTSD in a forensic population. The Scottish Government (2012) have identified that improving identification and response to trauma is a fundamental need, and evidence based treatment guidelines for trauma is provided in the Psychological Therapies Matrix, adult services (Scottish Government & NHS Education Board for Scotland, 2011). The Forensic Psychology Matrix recommend formulation led treatment with focus on underlying causes (Forensic Network, n.d.), thus not only treating the presenting behavioural responses of PTSD. The results of this study support that trauma informed treatment is required in forensic populations. Treatment including emotion regulation and social problem solving training, for those who have experienced childhood

maltreatment and/or experiencing PTS symptoms, may be beneficial in reducing trauma symptomatology in a forensic population.

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2.8 Appendices

Appendix 1: Author Guidelines: Acta Psychiatrica Scandinavica

Appendix 2: Definitions for Quality Assessment of Review Articles

Appendix 3: Author Guidelines: Journal of Traumatic Stress

Appendix 4: Letter of NHS Ethics Committee Approval

Appendix 5: Letter of NHS Tayside Research and Development Approval

Appendix 6: Letter of NHS Fife Research and Development Approval

Appendix 7: NHS Tayside Participant Information Sheet

Appendix 8: Participant Consent Form 1

Appendix 9: Participant Consent Form 2

Appendix 10: References for Thesis Portfolio

Appendix 1

Author Guidelines: Acta Psychiatrica Scandinavica

Manuscripts

Consult a current issue of the Journal for style and format. The text should be in double-spacing with broad margins. Review articles/meta-analyses, clinical overview articles and original articles all follow the same concept:

Page 1:

A concise, informative title (max 15 words; abbreviations, acronyms, colon, semicolon or the like are not allowed), the authors' names, the names in English of departments and institutions to be attributed, and their city and country of location. Please also include a running title with a maximum of 50 characters (letters and spaces). Name, telephone number, fax number, e-mail address and full postal address of the corresponding author should be stated.

Page 2:

Abstract not exceeding 200 words with the following structure: Objective, Method, Results, and Conclusion (the main part of the Abstract is devoted to Results). - Indication of 3 - 5 keywords in strict accordance with Medical Subject Headings.

For original articles specifically:

Significant Outcomes. Provide up to 3 Significant Outcomes encapsulating the 'take-home messages' of the article, and identify the main issues addressed with particular emphasis on clinical and/or scientific significance. The Significant Outcomes are to be presented succinctly (1 max 2 sentences each), in tabulated form, and logically emerge from the conclusions of the paper (without repeating). However, they must not be dogmatic, raise new issues or pose further questions. *Limitations.* In addition, each original article must cite up to 3 noteworthy Limitations. These should inform the reader about potential weaknesses, for instance in aspects of study design, methodology, analyses, the wider generalizability, or the wider application of findings.

The *Significant Outcomes* and the *Limitations* are placed immediately below the Abstract/Keywords.

For review articles/meta-analyses specifically:

Summations. Provide up to 3 significant Summations encapsulating the 'take-home messages' of the paper, and identify the main issues addressed with particular emphasis on their clinical and/or scientific significance. The Summations should be presented succinctly (1 max 2 sentences each), in tabulated form, and logically emerge from the conclusions of the paper (without repeating). However, they must not be dogmatic, raise new issues or pose further questions. *Considerations.* In addition, each review article must cite up to 3 noteworthy

Considerations in which authors essentially criticise the summations and include any caveats or limitations either of the review process or its conclusions.

The *Summations* and *Considerations* are placed immediately below the Abstract/Keywords.

For clinical overview articles specifically:

Clinical Recommendations. Provide up to 3 significant Clinical Recommendations. Present them succinctly (1 max 2 sentences each), in tabulated form, and logically emerge from the conclusions of the article (without repeating). However, they must not be dogmatic, raise new issues or pose further questions, and authors should avoid jumping to conclusions.

Additional Comments. In addition, each clinical overview article must provide up to 3 Additional Comments in which authors cite caveats/limitations and attempt to balance their recommendations by including for instance alternative contemporary views/recommendations.

The *Clinical Recommendations* and *Additional Comments* are placed immediately below the Abstract/Keywords.

Introduction:

One to two pages concluded by the subtitle *Aims of the Study* (3 to 5 lines without literature references and abbreviations).

A thorough *Material and methods* section. It should be possible to read every article by itself. The author cannot refer to design, method and material described in previously published articles.

Results. Clear and short avoiding double documentation to tables/figures.

Discussion:

Acta Psychiatrica Scandinavica articles do not have a conclusion section. If the authors find it necessary, they may include a concluding remark of maximum 5 lines as the final part of the Discussion.

Acknowledgements:

Should include grants, sponsorships and other support to the study. Some authors may wish to thank other collaborators apart from the authors. It is stressed that only a very few people can be listed. It is the responsibility of the author to obtain written permission from the persons mentioned.

Declaration of Interest:

Must be given if the study in any way involves pharmaceutical companies or other private or public enterprises. Each author must declare him/herself in general and not only in relation to the present study. If the study in any way investigates pharmaceutical

compounds, the *Declaration of Interest* must contain information about by whom and which institutions the statistical analyses were performed and an e-mail address where to obtain the protocol. Clinical studies must be registered in online clinical databases. Please state date for registration and registration number.

Tables and figures:

Must include legends. A maximum of 5 tables/figures can be included. Figures are given priority. Colour prints are welcomed, but please notice that authors must cover the additional production cost.

Debate papers

Letters to the Editor are welcomed to the *Acta Psychiatrica Scandinavica* debate section, in particular if they relate to ongoing debates or comment on recent publications in the Journal. A maximum of 5 references can be included in papers published in the Debate Section.

Abbreviations and symbols

For abbreviations and symbols use *Units, Symbols and Abbreviations for Authors and Editors in Medicine Related Sciences*, Sixth Edition. Edited by D.N. Baron and M McKenzie Clarke. ISBN: 9781853156243, Paperback, April, 2008. All terms or abbreviations should be fully explained at first mention. All units should be metric. Use no Roman numerals. Abbreviations are not allowed in titles, headings and "Aims of the Study".

References

Should be kept to the pertinent minimum and numbered consecutively in the order in which they appear in the text in accordance with the *Vancouver System*. Identify references in text, tables, and legends by Arabic numerals (in parentheses). References cited only in tables or figure legends should be numbered in accordance with a sequence established by the first identification of that figure or table in the text. Use the style of the examples below, which are based on Index Medicus. Abstracts cannot be used as references, unless published in an indexed scientific journal. Include manuscripts accepted, but not published; designate the abbreviated title of the journal followed by (in press). Papers published electronically, not yet hard copy publication should be identified by their DOI-number. Information from manuscripts not yet accepted should be cited in the text as personal communication. References must be verified by the authors against the original documents. Titles of journals should be abbreviated in accordance with Index Medicus. Examples:

Standard journal article: List all authors when 6 or fewer. When there are 7 or more, list only the first 3 authors and add "et al".
MAZZONCINI R, DONOGHUE K, HART J et al. Illicit substance use and its correlates in first episode psychosis. *Acta Psychiatr Scand* 2010;**121**:351-358
Chapter in book:

ISMAIL K. Unraveling the pathogenesis of the depression-diabetes link. In KATON W, MAJ, M, SATORIOUS N, eds. Depression and diabetes, Wiley-Blackwell, UK, 2010.

Illustrations/tables

All figures/tables should clarify the text and their number be kept to a minimum and not exceed 5 in total. Avoid data overload. Details must be large enough to retain their clarity after reduction in size. Illustrations should be planned to fit the proportions of the printed page. Colour illustrations are welcomed. Authors must cover the production cost of colour illustrations. Download the publisher's Colour Work Agreement Form.

Appendix 2

Definitions for Quality Assessment of Review Articles

1. Sampling strategy and representativeness of the target population	
Well Covered	There is a clear description of the method of selection, the inclusion/exclusion criteria was explicit and the eligible population was representative of the target population.
Adequately Addressed	The method of selection is addressed, but the inclusion/exclusion criteria are not explicit and / or do not best represent the target population.
Poorly Addressed	The method of selection and inclusion/exclusion criteria is poorly defined and / or does not best represent the target population.

2. Number of people approached and attrition rates	
Well Covered	The study reports the number of people approached about the study and attrition rates, in each of the groups being studied.
Adequately Addressed	The study attrition rates are not clear from the way the study is reported, or the study may not have addressed all attrition rates (for example, only reported rates for those who had started study, but not included how many were asked to take part).
Poorly Addressed	Attrition rates acknowledged, but not addressed or reported in any detail.

3. If attrition rates were problematic, data was handled appropriately (e.g. missing data imputed)	
Well Covered	Attrition rates were acknowledged as problematic, and an appropriate method for dealing with missing data was reported and implemented for analysis.
Adequately Addressed	Attrition rates are reported and acknowledged as problematic but it is less clear as to the method for appropriately dealing with the missing data.
Poorly Addressed	There is little detail as to the method of dealing with the missing data and a method was not appropriate.

4. Reliability and validity of outcome measures	
Well Covered	The psychometric properties of the outcome measures used are clearly described along with details of their validity and reliability. There is detail of validity and reliability within the population used in the study.
Adequately Addressed	The outcome measures are described but there are fewer details regarding their validity or reliability. The validity and reliability within the particular population are less clear.
Poorly Addressed	The use of outcome measures is mentioned but there is little reference to the validity and reliability of the measure or the measures selected are of poor reliability and validity with relevant populations.

5. Sample Size for Sufficient Power	
Well Covered	The sample size is sufficient and allows adequate power within each group for analysis.
Adequately Addressed	The sample size is arbitrary and does not consistently allow sufficient power for all analysis.
Poorly Addressed	Sample size is insufficient and is not addressed in the reporting of results.

6. Appropriateness of analyses to the study question/s and aim/s	
Well Covered	Appropriate analysis was conducted and reported that addresses the study aims and questions. Analysis is clearly linked with theoretical rationale. The analysis is described in detail and the results clearly presented. Method of quantitative analysis used provides meaningful results using causal pathways and analysis to understand underlying mechanisms in the relationship between variables (e.g. regression, mediation analysis).
Adequately Addressed	The quantitative analysis used provides meaningful results, however, the details of this is less well covered. A more basic level of analysis to investigate the relationship between variables is used.
Poorly Addressed	The method of analysis used has not been well considered and does not provide the best presentation of results from the study.

7. Precision of associations were reported (confidence intervals, effect sizes and p values)	
Well Covered	The results of association are clearly reported. Confidence intervals, effect sizes and p-values are reported where appropriate (i.e. if the study is under powered it may not be suitable to report precise associations).
Adequately Addressed	The results of associations are not fully reported, however are calculable. Confidence intervals may have been reported, but are wide ranged rather than precise.
Poorly Addressed	The p-values, effect sizes and / or confidence intervals may have been mentioned but are not sufficient in this case or well reported.

8. Internal Validity/ Management of Confounding Variables	
Well Covered	Confounding variables are identified and controlled for where possible.
Adequately Addressed	Confounding variables are acknowledged, but it is less clear how these were managed within the study design, analysis and interpretation.
Poorly Addressed	There is clear bias within the study design, analysis or results.

9. External validity	
Well Covered	There are clear details given about the study to determine if the findings are generalisable to the population targeted. There is discussion of the interpretation of results linked to a theoretical framework, limitations of the study and implications of the findings.
Adequately Addressed	There are some details regarding the generalisability of the findings, and some but more limited discussion of limitations and implications.
Poorly Addressed	It is not clear if the findings are generalisable and substantial gaps in discussion of the limitations and implications of the study.

Appendix 3

Author Guidelines: Journal of Traumatic Stress

Journal of Traumatic Stress

1. The *Journal of Traumatic Stress* accepts submission of manuscripts online at: <http://mc.manuscriptcentral.com/jots>

Information about how to create an account or submit a manuscript may be found online in the "Get Help Now" menu. Personal assistance also is available by calling 434-817-2040, x167.

2. Three paper formats are accepted. All word counts should include references, tables, and figures. *Regular articles* (no longer than 6,000 words) are theoretical articles, full research studies, and reviews. Purely descriptive articles are rarely accepted. In special circumstances, the editors will consider longer manuscripts (up to 7,500 words) that describe complex studies. Authors are requested to seek special consideration prior to submitting manuscripts longer than 6,000 words. *Brief reports* (2,500 words) are for pilot studies or uncontrolled trials of an intervention, case studies that cover a new area, preliminary data on a new problem or population, condensed findings from a study that does not merit a full article, or methodologically oriented papers that replicate findings in new populations or report preliminary data on new instruments. *Commentaries* (1,000 words or less) cover responses to previously published articles or, occasionally, essays on a professional or scientific topic of general interest. Response commentaries, submitted no later than 8 weeks after the original article is published (12 weeks if outside the U.S.), must be content-directed and use tactful language. The original author is given the opportunity to respond to accepted commentaries.

3. The *Journal* follows the style recommendations of the 2010 *Publication Manual of the American Psychological Association* (APA; 6th). Manuscripts should use non-sexist language. Files must be formatted using letter or A4 page size, 1 inch (2.54 cm) margins on all sides, Times New Roman 12 point font, and double-spacing for text, tables, figures, and references.

4. The title page should include the title of the article, the running head (maximum 50 characters) in uppercase flush left, author(s) byline and institutional affiliation, and author note (see pp. 23-25 of the APA manual).

5. An abstract no longer than 200 words follows the title page on a separate page.

6. Format the reference list using APA style: (a) begin on a new page following the text, (b) double-space, (c) use hanging indent format, (d) italicize the journal name or book title, and (e) list alphabetically by last name of first author. If a reference has a Digital Object Identifier (DOI), it must be included as the last element of the reference.

Journal Article

Kraemer, H.C. (2009). Events per person-time (incidence rate): A misleading statistic? *Statistics in Medicine*, 28, 1028–1039. doi: 10.1002/sim.3525

Book

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Book Chapter

Meehl, P. E. (2006). The power of quantitative thinking. In N.G. Waller, L.J. Yonce, W.M. Grove, D. Faust, & M.F. Lenzenweger (Eds.), *A Paul Meehl reader: Essays on*

the practice of scientific psychology (pp. 433–444). Mahwah, NJ: Erlbaum.

7. Tables and figures should be formatted in APA style. *Count each full-page table or figure as 200 words and each half-page table or figure as 100 words.* Tables should be numbered (with Arabic numerals) and referred to by number in the text. Each table and figure should begin on a separate page. Only black and white tables and figures will be accepted (no color). Figures (photographs, drawings, and charts) should be numbered (with Arabic numerals) and referred to by number in the text. Place figures captions at the bottom of the figure itself, not on a separate page. Include a separate legend to explain symbols if needed. Figures should be in Word, TIFF, or EPS format.

8. Footnotes should be avoided. When their use is absolutely necessary, footnotes should be formatted in APA style and placed on a separate page after the reference list and before any tables.

9. The *Journal* uses a policy of **unmasked review**. Author identities are known to reviewers; reviewer identities are not known to authors. During the submission process, authors may request that specific individuals not be selected as reviewers; the names of preferred reviewers also may be provided. Authors may request blind review by contacting jots@ucsf.edu prior to submission in order to provide justification and obtain further instructions.

10. Statement of ethical standards: All work submitted to the *Journal of Traumatic Stress* must conform to applicable governmental regulations and discipline-appropriate ethical standards. Responsibility for meeting these requirements rests with all authors. Human and animal research studies typically require approval by an institutional research committee that has been established to protect the welfare of human or animal subjects. Data collection as part of clinical services or for program evaluation purposes generally does not require approval by an institutional research committee. However, analysis and presentation of such data outside the program setting may qualify as research (i.e., an effort to produce generalizable knowledge) and require approval by an institutional committee. Those who submit manuscripts to the *Journal of Traumatic Stress* based on data from these sources are encouraged to consult with a representative of the applicable institutional committee to determine if approval is needed. Presentations that report on a particular person (e.g., a clinical case) also usually require written permission from that person to allow public disclosure for educational purposes, and involve alteration or withholding of information that might directly or indirectly reveal identity and breach confidentiality.

11. Reports of randomized clinical trials should include a flow diagram and a completed CONSORT checklist (available at <http://consort-statement.org/resources/downloads>). The checklist should be designated as a "Supplementary file not for review" during the online submission process. As of 2007, the *Journal of Traumatic Stress* now follows CONSORT Guidelines for the reporting of randomized clinical trials. Please visit <http://consort-statement.org> for information about the consort standards and to download necessary forms.

12. Submission is a representation that the manuscript has not been published

previously and is not currently under consideration for publication elsewhere. A statement transferring copyright from the authors (or their employers, if they hold the copyright) to the International Society for Traumatic Stress Studies will be required before the manuscript can be accepted for publication. Click on the Copyright Transfer Agreement link above for the form. Such a written transfer of copyright, which previously was assumed to be implicit in the act of submitting a manuscript, is necessary under the U.S. Copyright Law in order for the publisher to carry through the dissemination of research results and reviews as widely and effectively as possible.

13. Pre-Submission English-Language Editing: Authors for whom English is a second language may choose to have their manuscript professionally edited before submission to improve the English. Japanese authors can find a list of local English improvement services at <http://www.wiley.co.jp/journals/editcontribute.html>. All services are paid for and arranged by the author, and use of one of these services does not guarantee acceptance or preference for publication.

14. The author(s) are required to adhere to the "Ethical Principles of Psychologists and Code of Conduct" of the American Psychological Association (visit apastyle.org) or equivalent guidelines in the study's country of origin. If the author(s) were unable to comply, an explanation is requested.

Appendix 4

Letter of NHS Ethics Committee Approval

East of Scotland Research Ethics Service (EoSRES) REC 1

Tayside Medical Sciences Centre (TASC)
 Residency Block C, Level 3
 Ninewells Hospital & Medical School
 George Pirie Way
 Dundee DD1 9SY

Date: 17 March 2014
 Your Ref:
 Our Ref: LR/DL/14/ES/0018
 Enquiries to: Mrs Lorraine Reilly
 Extension: Ninewells extension: 83878
 Direct Line: 01382 383878
 Email: eosres.tayside@nhs.net

Dear

Study title: The Role of Emotion Regulation and Social Problem Solving Skills in the Relationship Between Childhood Maltreatment and Post Traumatic Stress Symptoms in an Adult Male Forensic Mental Health Population?

REC reference: 14/ES/0018

Protocol number: 2

IRAS project ID: 135779

Thank you for your email of 14 March 2014. I can confirm the REC has received the documents listed below and that these comply with the approval conditions detailed in our letter dated 27 February 2014

Documents received

The documents received were as follows:

Document	Version	Date
Other: Response to Conditions		
Other: Susanne O Rourke Additional Information		
Participant Information Sheet: Tayside	3	27 February 2014
Participant Information Sheet: Fife	3	27 February 2014

Could you please submit a copy of the amended Protocol with updated version number and date.

Approved documents

The final list of approved documentation for the study is therefore as follows:

Document	Version	Date
Evidence of insurance or indemnity		25 June 2013
GP/Consultant Information Sheets	1	11 October 2013
GP/Consultant Information Sheets	1	11 October 2013



Document	Version	Date
GP/Consultant Information Sheets	1	11 October 2013
GP/Consultant Information Sheets	1	11 October 2013
Investigator CV		
Investigator CV		11 October 2013
Other: Appointment Letter Fife	1	11 October 2013
Other: Appointment Letter Tayside	1	11 October 2013
Other: Demographic Information Sheet Tayside	2	13 December 2013
Other: Demographic Information Sheet Fife	2	13 December 2013
Other: Response to Conditions		
Other: Susanne O'Rourke Additional Information		
Participant Consent Form: Consent Form 1 Fife	2	13 December 2013
Participant Consent Form: Consent Form 1 Tayside	2	13 December 2013
Participant Consent Form: Consent Form 2 Fife	2	13 December 2013
Participant Consent Form: Consent Form 2 Tayside	2	13 December 2013
Participant Information Sheet: Staff Information Sheet Fife	2	13 December 2013
Participant Information Sheet: Staff Information Sheet Tayside	2	13 December 2013
Participant Information Sheet: Tayside	3	27 February 2014
Participant Information Sheet: Fife	3	27 February 2014
Protocol	2	13 December 2013
Questionnaire: Childhood Trauma Questionnaire.		
Questionnaire: Difficulties in Emotion Regulation Scale		
Questionnaire: Post Traumatic Stress Disorder Checklist. Civilian Version		
Questionnaire: Social Problem Solving Inventory Revised Short Form		
REC application		16 January 2014
Summary/Synopsis	2	13 December 2013

You should ensure that the sponsor has a copy of the final documentation for the study. It is the sponsor's responsibility to ensure that the documentation is made available to R&D offices at all participating sites.

14/ES/0018	Please quote this number on all correspondence
-------------------	---

Yours sincerely



Mrs Diane Leonard
Assistant Co-ordinator

E-mail: eosres.tayside@nhs.net

Copy to: Charlotte Clarke, University of Edinburgh
NHS Tayside R&D Office



Appendix 5

Letter of NHS Tayside Research and Development Approval

27 March 2014

Dear I

R & D MANAGEMENT APPROVAL - TAYSIDE

Title: The role of emotion regulation and social problem solving skills in the relationship between childhood maltreatment and post traumatic stress symptoms in an adult male forensic health population?

Chief Investigator:

Principal Investigator:

Tayside Ref: 2014PZ02

NRS Ref: NRS14/MH127

REC Ref: 14/ES/0018

EudraCT Ref: N/A

CTA Ref: N/A

Sponsor(s): University of Edinburgh

Funder(s): Unfunded

Many thanks for your application to carry out the above project here in NHS Tayside. I am pleased to confirm that the project documentation (as outlined below) has been reviewed, registered and Management Approval has been granted for the study to proceed locally in Tayside.

Approval is granted on the following conditions:-

- ALL Research must be carried out in compliance with the Research Governance Framework for Health & Community Care, Health & Safety Regulations, data protection principles, statutory legislation and in accordance with Good Clinical Practice (GCP).
- All amendments to be notified to TASC R & D Office.
- All local researchers must hold either a Substantive Contract, Honorary Research Contract, Honorary Clinical Contract or Letter of Access with NHS Tayside where required (http://www.nihr.ac.uk/systems/Pages/systems_research_passports.aspx).

- TASC R & D Office to be informed of change in Principal Investigator, Chief Investigator or any additional research personnel locally.
- Notification to TASC R & D Office of any change in funding.
- As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until destruction of this data.
- All eligible studies will be added to the UKCRN Portfolio <http://public.ukcrn.org.uk/>. Recruitment figures for eligible studies must be recorded onto the Portfolio every month: This is the responsibility of the lead UK site. If you are the lead, or only, UK site, we can provide help or advice with this. For information, contact Sarah Auld – (01382) 383822 – sarah.auld@nhs.net or Liz Livingstone – (01382) 383872 – elivingstone@nhs.net.
- Annual reports are required to be submitted to TASC R & D Office with the first report due 12 months from date of issue of this management approval letter and at yearly intervals until completion of the study.
- Notification of early termination within 15 days or End of Trial within 90 days followed by End of Trial Report within 1 year to TASC R & D Office.
- You may be required to assist with and provide information in regard to audit and monitoring of study.

Please note you are required to adhere to the conditions, if not, NHS management approval may be withdrawn for the study.

Approved Documents

Document	Version	Date
Protocol	3	19/03/14
IRAS R & D Form		
SSI Form		
PIS – Tayside	3	27/02/14
PIS – Fife	3	27/02/14
Staff information sheet Tayside	2	13/12/13
Staff information sheet Fife	2	13/12/13
Participant details consent form 1 – Tayside	2	13/12/13
Participant details consent form 1 – Fife	2	13/12/13
Consent form 2 – Tayside	2	13/12/13
Consent form 2 – Fife	2	13/12/13
Appointment letter – Tayside	1	11/10/13
Appointment letter – Fife	1	11/10/13
RMO letter 1 – Tayside	1	11/10/13
RMO letter 1 – Fife	1	11/10/13
RMO letter 2 – Tayside	1	11/10/13
RMO letter 2 – Fife	1	11/10/13
Insurance		25/06/13
Demographic information sheet – Tayside	2	13/12/13
Demographic information sheet – Fife	2	13/12/13
Emotions questionnaire		
CTQ		
PCL-C		
SPSI – R:S		
CV		11/10/13
REC favourable opinion with conditions		27/02/14

REC compliance		17/03/14
REC AM01 letter		19/03/14
CV – Suzanne O'Rourke		
Suzanne O'Rourke further information		

May I take this opportunity to wish you every success with your project.

Please do not hesitate to contact TASC R & D Office should you require further assistance.

Yours sincerely,



Elizabeth Coote
R&D Manager

Tayside medical Science Centre (TASC)
Ninewells Hospital & Medical School
TASC Research & Development Office
Residency Block, Level 3
George Pirie Way
Dundee DD1 9SY
Email: liz.coote@nhs.net
Tel: 01382 383876 Fax: 01382 740122

c.c.

Sponsor Rep Charlotte Clark
Suzanne O'Rourke
NRSPCC

Appendix 6

Letter of NHS Fife Research and Development Approval

Medical Director, Primary Care
Room 313
Hayfield House
Hayfield Road
KIRKCALDY
Fife KY2 5AH
Tel 01592 643355
www.show.scot.nhs.uk/fpct

Date 7 April 2014
Our Ref 14-010 NRS14/MH127
14/ES/0018
Enquiries to Aileen Yell
Tel No 01383 623623 Ext 20940
Email aileen.yell@nhs.net

Dear [REDACTED]

Project Title: Variables that affect trauma symptomatology in adulthood

Thank you for your application to carry out the above project. Your project documentation (detailed below) has been reviewed for resource and financial implications for NHS Fife and I am happy to inform you that NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

Document	Version	Date
Protocol	2	13 December 2013
IRAS R&D Form	3.5	7 February 2014
IRAS SSI Form	3.5	10 February 2014
Various documents referred to in REC letter		
REC provisional favourable opinion letter		27 February 2014
REC letter confirming compliance with approval conditions		17 March 2014
REC letter acknowledging non-substantial amendment AM01		19 March 2014
NRS-PCC Certificate of Compliance		27 March 2014

The terms of the approval state that you are the Principal Investigator authorised to undertake this study within NHS Fife. I note that the favourable ethical opinion applies to all NHS sites taking part in the study therefore no separate Site Specific Review is required in this case.

I note that a Letter of Access is required and that you are in the process of arranging this via our R&D Department. **Please note that this approval is subject to the Letter of Access being in place prior to you beginning any study procedures within NHS Fife.**

The sponsors for this study are University of Edinburgh.

Details of our participation in studies will be included in annual returns we are expected to complete as part of our agreement with the Chief Scientist Office. Regular reports of the study require to be submitted. Your first report should be submitted to Dr A Wood, R&D Manager, R&D Department, Queen Margaret Hospital, Whitefield Rd, Dunfermline, KY12 0SU (Amanda.wood3@nhs.net) in 12 months time and subsequently at yearly intervals until the work is completed. A Lay Summary will also be required upon completion of the project.

In addition, approval is granted subject to the following conditions:-

All research activity must comply with the standards detailed in the Research Governance Framework for Health & Community Care (<http://www.cso.scot.nhs.uk/publications/resgov/resgov.htm>), health & safety regulations, data protection principles, other appropriate statutory legislation and in accordance with Good Clinical Practice (GCP).

Any amendments which may subsequently be made to the study should also be notified to Aileen Yell, Research Governance Officer (aileenyell@nhs.net), as well as the appropriate regulatory authorities. Notification should also be given of any new research team members post approval and/or any changes to the status of the project.

This organisation is required to monitor research to ensure compliance with the Research Governance Framework and other legal and regulatory requirements. This is achieved by random audit of research. You will be required to assist with and provide information in regard to monitoring and study outcomes (including providing recruitment figures to the R&D office as and when required).

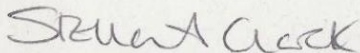
As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until the destruction of this data.

Permission is only granted for the activities for which a favourable opinion has been given by the REC (and which have been authorised by the MHRA where appropriate).

The research sponsor or the Chief Investigator or local Principal Investigator at a research site may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety. The R&D office (aileenyell@nhs.net) should be notified that such measures have been taken. The notification should also include the reasons why the measures were taken and the plan for further action. The R&D office should be notified within the same time frame of notifying the REC and any other regulatory bodies.

I would like to wish you every success with your study and look forward to receiving a summary of the findings for dissemination once the project is complete.

Yours sincerely



DR STELLA CLARK
Medical Director, Primary Care
NHS Fife

*Cc : Aileen Yell, Research Governance Officer, NHS Fife, Queen Margaret Hospital, Dunfermline
NRSPCC, R&D Office, Foresterhill House Annex, Foresterhil, Aberdeen AB25 2ZB*

Appendix 7
NHS Tayside Participant Information Sheet



Participant Information Sheet

What Factors Influence Whether People Develop Trauma Symptoms in Adulthood

My name is Susan Allan. I am doing a research study as part of my training course to become a Clinical Psychologist and you are being invited to take part in this study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve if you do decide to take part. Please take time to read this information sheet. You can also talk to others about the study if you wish. Take time to decide whether or not you wish to take part. If there is anything that is not clear to you or if you would like more information then please ask a member of staff or contact me using the details I have provided at the end of this form. This information sheet is for you to keep.

What is the purpose of the study?

We know that experiences people have in childhood can affect people in different ways. The study aims to learn more about experiences people have in childhood and symptoms, they may or may not experience, of trauma in adulthood. We are interested in people's childhood experiences and whether the way people manage emotions and how people solve problems affect whether or not some people experience trauma symptoms in adulthood. It is hoped that this study will help in better understanding the factors that can influence the likeliness of people experiencing trauma symptoms in adulthood and help in the development of better treatments for those people.

Why have I been invited to take part?

You have been invited to take part in this study as you are currently receiving care from NHS Tayside Forensic Mental Health Service.

Do I have to take part?

No, it is up to you to decide whether or not to take part. Your participation is entirely voluntary. If you decide to take part, you are still free to change your mind. You can stop taking part at any point during the study. You do not need to give anyone a reason if you decide not to take part or change your mind during the study.

The care you receive from NHS Tayside Forensic Mental Health Service will stay the same whether or not you decide to take part.

What will I be asked to do if I decide to take part?

If you are interested in taking part in this study, you will be asked to sign a consent form. This will allow staff to contact me and let me know that you are interested. I will then arrange to come and meet with you. This will be at a time that is convenient for you and in a location that is familiar to you. The meeting will be at your home or at an NHS location, for example, this may be at Rohallion Secure Care Clinic or Birnam Day Centre. The meeting will be at least 24 hours after your details have been provided to me. This will allow you more time to think about taking part in the study.

When we meet, I will go through this information sheet with you. I will answer any questions you may have about the study. Expressing an interest and meeting with me does not commit you to taking part and you can withdraw from the study at any point. If you decide you would like to take part, I will ask you to complete a consent form. This says that you understand what the study involves and you agree to take part in the study.

If you agree to take part and sign the consent form, we will begin the study. The study includes four questionnaires. These questionnaires ask about your childhood experiences, how you manage emotions, how you solve problems and about current symptoms you may or may not presently experience. This should not take more than 45 minutes and you will be offered breaks.

Staff will be asked to complete a brief Demographic Information Sheet about you. This will include your age, if you receive care in the community or a ward and what level of security this ward is, the number years you have received care from a Forensic Mental Health Service and whether you have previously received care in The State Hospital, Carstairs.

What are the possible disadvantages and risks of taking part?

It is not thought that there are many disadvantages. The study may take about 45 minutes so it is possible that you may feel tired. You will be offered breaks. If you feel tired or wish to stop, you can say this at any time. If you are tired or wish to stop early, we can arrange another meeting to finish the questionnaires if you would like to.

The questionnaires used in this study have been used by other clinical and research teams. There is no evidence to suggest that completing the questionnaires will cause any harm to you. However, some questions may make you think about difficult experiences. You may find this upsetting. You do not have to answer any questions that you do not want to answer. If you do become upset you can speak to me or someone from your staff team.

What are the possible benefits of taking part?

There is unlikely to be a direct benefit to you from taking part in this study. However, you may feel that by taking part in the study you will contribute to a greater understanding of the factors that may explain why some individuals experience trauma symptoms in adulthood.

Will my taking part in the study be kept confidential?

All the information we collect during the course of the study will be kept confidential. There are strict laws which safeguard your privacy at every stage of the study. Only my supervisors (Dr Elaine Whitefield, Professor Kevin Power and Dr Suzanne O'Rourke) and I will be allowed to look at the information that you give me. After you have completed the questionnaires, your name and identifiable information will be removed and replaced by a code. This means only the research team will know who has completed the questionnaires. The Demographic Information Sheet will also have your name removed and replaced by a code to keep it confidential. Your Psychiatrist / Responsible Medical Officer will be informed if we meet to discuss the study and if you take part in this study, but they will not be allowed to look at the information that you give me.

If, at any stage, you tell me information indicative of a criminal offence or tell me something that makes me think you are at risk of harm to yourself, or other people around you are at risk of harm, I will have to tell someone. This is to make sure that you and other people are safe. I will only tell a qualified member of staff and I will discuss this with you before I speak to them.

What happens when the study is finished?

At the end of our meeting you will have the chance to talk about your experience of taking part in the study with me. You can also discuss your experience of taking part in the study with a member of staff if you would like to.

I will keep the completed consent form and questionnaires in a locked NHS cabinet. I will also store the information on a NHS computer so I can analyse the data when I have finished collecting information from all other participants. The information on the NHS computer will be protected with a password to keep it confidential.

What will happen to the results of the study?

The study will be written up as part of my course work and submitted to the University of Edinburgh as part of my training in the Doctorate of Clinical Psychology. I will also write up the results of this study for publication in a scientific journal and present the results to relevant interested groups and conferences. The results will be anonymised. This means that no participants will be named and no one that has taken part can be identified.

Can I find out the results of the study?

Yes. You will be able to get a written summary of the study by asking a staff member from your mental health team.

Who has reviewed the study?

The East of Scotland Research Ethics Committee REC 1, which has responsibility for scrutinising all proposals for medical research on humans in Tayside, has examined the proposal and has raised no objections from the point of view of medical ethics. It is a requirement that your records in this research, together with any relevant records, be made available for scrutiny by monitors from the University of Edinburgh and NHS Tayside whose role is to check that research is properly conducted and the interests of those taking part are adequately protected.

Who do I contact if I want to make a complaint?

If there is anything you are unhappy with about the study then please tell us first. This will allow us to explain anything about the study that you are unsure about or try and solve any problems.

If you wish to complain about the way you have been treated by the researchers, or anyone else involved in the study you can do this by writing to the Complaints and Feedback Team Lead, Complaints and Advice Team, Level 9, Ninewells Hospital, Dundee, DD1 9SY. Alternatively, you can email: complaints.tayside@nhs.net or phone: 0800 027 5507.

If you have any further questions about the study please contact:

Susan Allan, Trainee Clinical Psychologist, on: (01738) 562253 or email: sallan1@nhs.net

If you would like to discuss this study with someone independent of the study please contact:

Dr Linda Graham on (01382) 306150 or email: l.graham@nhs.net

Thank you for taking the time to read this information sheet and considering whether you would like to participate in this study.

Appendix 8

Participant Consent Form 1



PARTICIPANT DETAILS - CONSENT FORM 1
What Factors Influence Whether People Develop Trauma Symptoms in Adulthood?

Details of Participant

Name: _____

Current
Address: _____

Telephone: _____

Details of Named Nurse

Name: _____

Workplace
Address: _____

Telephone: _____

I agree for my contact details to be passed to Susan Allan and for her to arrange a meeting with me to discuss the study further.

I understand that my Psychiatrist / Responsible Medical Officer will be told that I am meeting with Susan Allan to discuss the study further.

I would like to be contacted about the meeting with Susan Allan by:
(Please tick the relevant box)

Phone ☐

Letter ☐

No preference ☐

Name of Potential Participant

Date

Signature

Name of Person Taking Consent Date
Please send the completed form to sallan1@nhs.net

Signature

Appendix 9

Participant Consent Form 2



CONSENT FORM 2
What Factors Influence Whether People Develop Trauma Symptoms in Adulthood?

Please initial each box if you agree with the statement

1. I confirm that I have read and understood the Participant Information Sheet (Version 3, 27/02/2014). ☐
2. I have had time to consider the information and ask questions about the study. ☐
3. I understand that I do not have to take part in the study and I can stop taking part at any time. I will not have to give a reason if I decide to stop the study. ☐
4. I understand that taking part or not taking part will not affect the care I receive from any services now or in the future. ☐
5. I understand that if I say something that indicates risk to myself or others, Susan Allan will have to pass this information on to a qualified member of staff. ☐
6. I understand that my Psychiatrist / Responsible Medical Officer will be told that I am taking part in the study. ☐
7. I understand that all information that I give will be stored securely and kept confidential. ☐
8. I understand that relevant sections of data collected during the study may be looked at by the study research team (Susan Allan, Dr Elaine Whitefield, Professor Kevin Power and Dr Suzanne O'Rourke) and individuals from the Sponsor (University of Edinburgh) where it is relevant to my taking part in this research. I give permission for these individuals to have access to my data. ☐
9. I agree to take part in the study. ☐

Name of Participant

Date

Signature

Name of Person Taking Consent

Date

Signature

Appendix 10

References for Thesis Portfolio

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